Data Reduction Procedure
21-SPONGE Pilot Data (Summer 2011)

Some Notes:

- *Steps vary slightly if working with observations where the BP and phase calibrators (or the BP and phase calibrators and the target source) are the same (see notes at end).*

- *It is a good idea to check SN and CL tables with task SNPLT (can also use LISTR with optype = 'GAIN' to look at SN tables).*

- *The inputs below are for example, so the source entries may not match...the other inputs should be correct though. I tried to highlight the important adverbs you should set/check each time.*

- *I hope you find this useful. If something seems wrong or you need clarification or more information on what I did, feel free to e-mail me, Dan Able, at dable@fastmail.net*

1. Retrieve data from archive.

2. Check the scan configurations using the verb BDFLIST. The adverb ASDMFILE is a 2 element array. The first element should be the path to the FITS directory, including the final /. The second element is the directory containing the BDF data (make sure not to use a closing quote to avoid the capitalization of the directory…it is the only think in AIPS that is case sensitive). You should have configurations 0, 1 and 2, with config 0 being on frequency.

   - AIPS 1: BDFLIST: Verb runs OBIT task ASDMList to list ASDM file contents
   - AIPS 1: Adverbs   Values   Comments
   - AIPS 1: --
   - AIPS 1: DOWAIT   -1   > wait for and display output
   - AIPS 1: DOCRT   1   > 0 display output on
   - AIPS 1:   terminal, else message file
   - AIPS 1: ASDMFILE   '/DATA/SUM-DABLE_2/FITS/' Full path name to ASDM dir.
   - AIPS 1:   '10C-196.sb4251522.eb4252511.55715.26735401621'

3. Use the verb BDF2AIPS to load in each configuration. We've been using the following outname system: {source}{day#}-{config}. For example 3c120D2-A is the data for target 3c120 from the second set of observations with configuration 0 (A=0, B=1, C=2).

   - AIPS 1: BDF2AIPS: Verb to read EVLA ASDM/BDF data into AIPS
   - AIPS 1: Adverbs   Values   Comments
   - AIPS 1: --
   - AIPS 1: DOWAIT   -1   > wait for and display output
   - AIPS 1: DOCRT   1   > 0 display output on
   - AIPS 1:   terminal, else message file
   - AIPS 1: ASDMFILE   '/DATA/SUM-DABLE_2/FITS Full path name to ASDM dir.
   - AIPS 1:   /'
   - AIPS 1:   '10C-196.sb4251522.eb4252511.55715.26735401621'
   - AIPS 1: OUTNAME   ' '   Output UV file name (name)
   - AIPS 1:   blank => BDF2AIPS
   - AIPS 1: OUTCLASS   ' '   Output UV file name (class)
   - AIPS 1:   blank => UVEVLA
   - AIPS 1: OUTDISK   1   Output disk drive #

- AIPS 1: DOUVCOMP   -1   >=0 => write compressed data
- AIPS 1: CLINT   0   CL table interval (min)
- AIPS 1:   0 -> 0.25
- AIPS 1: CONFIG   2   Select this "configuration"
- AIPS 1:   # - see BDFLIST output
- AIPS 1: NCHAN   0   Select only data with this
- AIPS 1:   # spectral channels/window
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: NIF   0   Select only data with this
- AIPS 1:   # spectral windows 0 -> any
- AIPS 1: BAND   'L'   Select only frequency band
- AIPS 1:   ('L','C',...) blank => any
- AIPS 1: CALCODE   ' '   Select only scans with this
- AIPS 1:   value of CALCODE

4. Make a scan summary listing (use task LISTR, set docrt = -1 to print) for records
   - AIPS 1: LISTR: Task to print UV data and calibration tables.
   - AIPS 1: Adverbs   Values   Comments
   - AIPS 1: --
   - AIPS 1: INNAME   '4C12-50-A'   UV data (name).
   - AIPS 1: INCLASS   'UVEVLA'   UV data (class).
   - AIPS 1: INSEQ   1   UV data (seq. #). 0 => high
   - AIPS 1: INDISK   1   Disk unit #.   0 => any
   - AIPS 1: OPTYPE   'SCAN'   List type:
   - AIPS 1:   'MATX','LIST','GAIN','SCAN'
   - AIPS 1:   'EFST','SEFD' special GAINs
   - AIPS 1: INEXT   ' '   CL, SN or TY table for 'GAIN'
   - AIPS 1: INVER   0   CL, Sn or TY table version
   - AIPS 1: SOURCES   *all ' '   Source list
   - AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
   - AIPS 1: TIMERANG   *all 0   Time range to list
   - AIPS 1: STOKES   ' '   Stokes type to list.
   - AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
   - AIPS 1: SELFREQ   -1   Frequency to select (MHz)
   - AIPS 1: FREQID   -1   Freq. ID to select.
   - AIPS 1:   None selected => 1.
   - AIPS 1: BIF   0   Lowest IF number 0=1
   - AIPS 1: ** press RETURN for more, enter Q or next line to quit print **

5. Print Antenna Config (PRTAN) for records
   - AIPS 1: PRTAN: Task to print the Antenna (AN) extension of a uv file.
   - AIPS 1: Adverbs   Values   Comments
   - AIPS 1: --

- AIPS 1: INNAME   '4C12-50-A'   Image name (name)
- AIPS 1: INCLASS   'UVEVLA'   Image name (class)
- AIPS 1: INSEQ   1   Image name (seq. #)
- AIPS 1: INDISK   1   Disk drive #
- AIPS 1: INVERS   0   AN file ver. #
- AIPS 1: NPRINT   0   No. records to print 0 => all
- AIPS 1: DOCRT   -1   > 0 => use terminal instead
- AIPS 1:   > 72 => terminal width
- AIPS 1: OUTPRINT   ' '
- AIPS 1:   Printer disk file to save
- AIPS 1: DOBTWEEN   1   > 0 -> print relative antenna
- AIPS 1:   positions also

6. Do a test bandpass to look for bad antennas on B & C (BPASS), this creates BP1. Be sure that calsour is set to your bandpass calibrator. Use the EVLA recommended inputs for BPASS (see AIPS cookbook supplement for EVLA considerations).

  - AIPS 1: BPASS   Task to generate a "Bandpass" (BP) table.
  - AIPS 1: Adverbs   Values   Comments
  - AIPS 1: --
  - AIPS 1: INNAME   '3C225BD1-A'   Input UV file name (name)
  - AIPS 1: INCLASS   'UVEVLA'   Input UV file name (class)
  - AIPS 1: INSEQ   1   Input UV file name (seq. #)
  - AIPS 1: INDISK   2   Input UV file disk unit #
  - AIPS 1:
  - AIPS 1:   Data Selection
  - AIPS 1: CALSOUR   '0137+331=3C48'   Bandpass calibrator sources.
  - AIPS 1:   *rest ' '
  - AIPS 1: QUAL   -1   Calibrator qualifier -1=>all
  - AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
  - AIPS 1: UVRANGE   0   0   UV range to select
  - AIPS 1: TIMERANG   *all 0   Time range to select
  - AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
  - AIPS 1: SELFREQ   -1   Frequency to select (MHz)
  - AIPS 1: FREQID   -1   Freq. ID to select.
  - AIPS 1: BIF   0   Lowest IF number 0=>all
  - AIPS 1: EIF   0   Highest IF number 0=>all
  - AIPS 1: SUBARRAY   0   Subarray, 0=>all
  - AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
  - #
  - AIPS 1: ANTENNAS   *all 0   Antennas to select
  - AIPS 1:
  - AIPS 1:   CLEAN map (optional)
  - AIPS 1: IN2NAME   ' '   Cleaned map name (name)

- AIPS 1: IN2CLASS ' '   Cleaned map name (class)
- AIPS 1: IN2SEQ   0   Cleaned map name (seq. #)
- AIPS 1: IN2DISK   0   Cleaned map disk unit #
- AIPS 1: INVERS   -1   CC file version #.
- AIPS 1: NCOMP   *all 0   # comps to use for model.
- AIPS 1:   1 value per field
- AIPS 1: FLUX   0   Lowest CC component used.
- AIPS 1: NMAPS   0   No. Clean map files
- AIPS 1: CMETHOD   ' '   Modeling method:
- AIPS 1:   'DFT','GRID','   '
- AIPS 1: CMODEL   ' '   Model type: 'COMP','IMAG'
- AIPS 1:   'SUBI' (see HELP re images)
- AIPS 1: SMODEL   *all 0   Source model, 1=flux,2=x,3=y
- AIPS 1:   See HELP SMODEL for details.
- AIPS 1:
- AIPS 1:   Control options
- AIPS 1: DOCALIB   1   > 0 calibrate data & weights
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   > 99 do NOT calibrate weights
- AIPS 1: GAINUSE   1   CL table to apply (SN table
- AIPS 1:   to apply to single-source)
- AIPS 1: DOPOL   -1   If >0 correct polarization.
- AIPS 1: PDVER   0   PD table to apply (DOPOL>0)
- AIPS 1: BLVER   -1   BL table to apply.
- AIPS 1: FLAGVER   0   Flag table version
- AIPS 1: DOBAND   -1   If >0 apply bandpass cal.
- AIPS 1:   Method used depends on value
- AIPS 1:   of DOBAND (see HELP file).
- AIPS 1: BPVER   -1   Bandpass table version
- AIPS 1: SOLINT   0   Solution interval (mins)
- AIPS 1:   -1 => do whole time range
- AIPS 1: SOLTYPE   ' '   Soln type,' ','L1','GCON',
- AIPS 1:   'R', 'L1R', 'GCOR'
- AIPS 1: REFANT   22   Reference antenna
- AIPS 1: OUTVERS   0   Output BP table version
- AIPS 1:   0 => a new table to be
- AIPS 1:   generated.
- AIPS 1: SMOOTH   *all 0   Smoothing function.
- AIPS 1:   BE VERY CAREFUL HERE.
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #

- AIPS 1: ANTWT   *all 0   Ant. wts (0 => 1.)
- AIPS 1: WEIGHTIT   0   Modify data weights function
- AIPS 1: MINAMPER   0   Amplitude closure error
- AIPS 1:   regarded as excessive in %
- AIPS 1: MINPHSER   0   Phase closure error regarded
- AIPS 1:   as excessive in degrees
- AIPS 1: BPASSPRM   0   0   Control information:
- AIPS 1:   0   0   1: if > 0 use only the
- AIPS 1:   1   0   autocorrelation data.
- AIPS 1:   0   0   2: print level - see help
- AIPS 1:   0   3   3: If > 0 do not divide data
- AIPS 1:   0   by source model
- AIPS 1:   4: If > 0 store phases only
- AIPS 1:   in the BP table. If < 0
- AIPS 1:   store amplitudes only.
- AIPS 1:   5: Divide by 'channel 0'
- AIPS 1:   **** CHANGED MAY 2010 ****
- AIPS 1:   6: amp closure error limit -
- AIPS 1:   print channels averaging
- AIPS 1:   over this if (2) > 0
- AIPS 1:   7: phase closure error limit
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   print channels averaging
- AIPS 1:   over this if (2) > 0
- AIPS 1:   8: > 0 => scalar average
- AIPS 1:   9: > 0 => interpolate over
- AIPS 1:   flagged channels if poss.
- AIPS 1:   10:1 => normalize amplitudes
- AIPS 1:   using all channels
- AIPS 1:   2 => normalize amplitudes
- AIPS 1:   using ICHANSEL channels
- AIPS 1:   3 => normalize amplitudes
- AIPS 1:   and zero average phase
- AIPS 1:   using ICHANSEL channels
- AIPS 1:   4 => normalize amplitudes
- AIPS 1:   and zero average phase
- AIPS 1:   using all channels
- AIPS 1:   0 => no deliberate norm.
- AIPS 1:   11: > 0 solution weights are
- AIPS 1:   independent of channel
- AIPS 1:   = -1 weights scaled

- AIPS 1:   by amplitude**2
- AIPS 1:   < -1.5 weights scaled by
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   1 / amplitude**2
- AIPS 1: ICHANSEL   50   205   Array of start and stop chan
- AIPS 1:   1   1   numbers, plus a channel
- AIPS 1:   *rest 0   increment and IF to be used
- AIPS 1:   to select channels to sum to
- AIPS 1:   find a 'channel 0'. If all
- AIPS 1:   0, range set to inner 75% of
- AIPS 1:   observing band.
- AIPS 1: SPECINDX   0   Spectral index to correct
- AIPS 1: SPECURVE   *all 0   Spectral index curvature
- AIPS 1:   'Channel 0' uv-data
- AIPS 1: IN3NAME   ' '   Channel 0 uv name (name)
- AIPS 1:   must be '' to suppress option
- AIPS 1: IN3CLASS   ' '   Channel 0 uv name (class)
- AIPS 1:   must be '' to suppress option
- AIPS 1: IN3SEQ   0   Channel 0 uv name (seq. #)
- AIPS 1: IN3DISK   0   Channel 0 uv disk unit #
- AIPS 1: BADDISK   *all 0   Disks to avoid for scratch

5. Use POSSM to view the bandpass just created (check all antennas together and each antenna individually for sick antennas). Make sure sources is set to your bandpass calibrator and APARM(8) = 2.

- AIPS 1: POSSM   Task to plot total and cross-power spectra.
- AIPS 1: Adverbs   Values   Comments
- AIPS 1: ---
- AIPS 1: USERID   0   User number - ignored
- AIPS 1: INNAME   '3C225BD2-BC'   Input UV file name (name)
- AIPS 1: INCLASS   'UVEVLA'   Input UV file name (class)
- AIPS 1: INSEQ   1   Input UV file name (seq. #)
- AIPS 1: INDISK   2   Input UV file disk unit #
- AIPS 1: SOURCES   '0137+331=3C48'   Source list
- AIPS 1: QUAL   -1   Source qualifier -1=>all
- AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
- AIPS 1: SELFREQ   -1   Frequency to select (MHz)
- AIPS 1: FREQID   -1   Freq. ID to select.
- AIPS 1: UVRANGE   0   0   UV range to be plotted
- AIPS 1: TIMERANG   *all 0   Time range to be plotted
- AIPS 1: STOKES   ' '   Stokes type(s) to select.

- AIPS 1: BIF   0   Lowest IF number 0=>all
- AIPS 1: EIF   0   Highest IF number 0=>all
- AIPS 1: BCHAN   0   Lowest channel number 0=>all
- AIPS 1: ECHAN   0   Highest channel number 0=>all
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: SUBARRAY   0   Subarray, 0=>1
- AIPS 1: ANTENNAS   *all 0   Antennas to select
- AIPS 1: BASELINE   *all 0   Baselines with ANTENNAS
- AIPS 1: DOCALIB   -1   > 0 calibrate data & weights
- AIPS 1:   > 99 do NOT calibrate weights
- AIPS 1: GAINUSE   2   CL (or SN) table to apply
- AIPS 1: DOPOL   -1   If >0 correct polarization.
- AIPS 1: PDVER   0   PD table to apply (DOPOL>0)
- AIPS 1: BLVER   -1   BL table to apply.
- AIPS 1: FLAGVER   0   Flag table version
- AIPS 1: DOBAND   -1   If >0 apply bandpass cal.
- AIPS 1:   Method used depends on value
- AIPS 1:   of DOBAND (see HELP file).
- AIPS 1: BPVER   1   Bandpass table version
- AIPS 1: SMOOTH   1   *rest 0   Smoothing function. See
- AIPS 1:   HELP SMOOTH for details.
- AIPS 1: SHIFT   0   0   Position shift:
- AIPS 1:   RA, Dec (arcsec)
- AIPS 1:   0 => no shift
- AIPS 1: APARM   0   0   Control information:
- AIPS 1:   0   0   1: < 0 => scalar average
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   0   0   >= 0 => vector average
- AIPS 1:   0   2   2: = 0 => self-scale
- AIPS 1:   0   0   > 0 => fixed scale
- AIPS 1:   (use APARM(3-6))
- AIPS 1:   3: min. amplitude
- AIPS 1:   4: max. amplitude
- AIPS 1:   5: min. phase (degrees)
- AIPS 1:   6: max. phase
- AIPS 1:   7: x-axis labelling
- AIPS 1:   = 0 = > in channels.
- AIPS 1:   = 1 = > in Hz (or secs
- AIPS 1:   if corr. fn)
- AIPS 1:   = 2 = > in m/s

- AIPS 1:   8: = 0 => plot cross power
- AIPS 1:   = 1 => plot total power
- AIPS 1:   = 2 => plot BP table
- AIPS 1:   version BPVER
- AIPS 1:   = 3 => plot ACF
- AIPS 1:   = 4 => plot XCF
- AIPS 1:   = 5 => plot BD table
- AIPS 1:   version BPVER
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   = 6 => plot PD table
- AIPS 1:   version BPVER
- AIPS 1:   = 7 => plot CP table
- AIPS 1:   version BPVER
- AIPS 1:   = 8 => plot CP table / I
- AIPS 1:   version BPVER
- AIPS 1:   9: > 0 => plot several IF's
- AIPS 1:   and/or polarizations
- AIPS 1:   together as though one
- AIPS 1:   long spectrum (see HELP)
- AIPS 1:   10: > 0 => reverse direction
- AIPS 1:   of plotted spectrum, so
- AIPS 1:   velocity increases to
- AIPS 1:   right.
- AIPS 1: CODETYPE   ' '   'A&P ', 'AMP ', 'PHAS',
- AIPS 1:   'R&I ', 'REAL', 'IMAG'
- AIPS 1:   'LA&P', 'LAMP'
- AIPS 1:   other => 'A&P '
- AIPS 1: POLPLOT   ' '   Option to display various
- AIPS 1:   combinations of polzns to
- AIPS 1:   plot: 'RL/RR', 'RL/LL',
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   'LR/RR', 'LR/LL', 'RR/LL'
- AIPS 1:   'LL/RR'; other = don't use
- AIPS 1:   this option.
- AIPS 1: SOLINT   0   If SOLINT > 0 then it enables
- AIPS 1:   the user to make multiple
- AIPS 1:   plots per pass of POSSM.
- AIPS 1:   It defines the averaging time
- AIPS 1:   for each individual plot.
- AIPS 1:   Task will start at TIMERANG

- AIPS 1:   and make a plot for every
- AIPS 1:   SOLINT minutes. If SOLINT
- AIPS 1:   = -1 will do the same but
- AIPS 1:   will do scan averages if NX
- AIPS 1:   table is present.
- AIPS 1: NPLOTS   0   Number of plots per page
- AIPS 1: BPARM   *all 0   More control information:
- AIPS 1:   1: If = 1 divide by 'channel
- AIPS 1:   0' before plotting data.
- AIPS 1:   0 => do not divide.
- AIPS 1:   2: Start chn. of 'channel 0'
- AIPS 1:   (0 => determined by POSSM)
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   3: Stop chn. of 'channel 0'
- AIPS 1:   (0 => determined by POSSM)
- AIPS 1:   4: ignore spectrum when ampl.
- AIPS 1:   channel 0 < BPARM(4) Jy
- AIPS 1:   5: scale LOG10 plots by B(5)
- AIPS 1:   6-9: unused
- AIPS 1:   10: =1 => don't write header
- AIPS 1:   info when writing to outfile
- AIPS 1:   useful for appending several
- AIPS 1:   spectra into a single outfile
- AIPS 1:   [see EXPLAIN POSSM]
- AIPS 1: OUTTEXT   ' '
- AIPS 1:   Filename in which to write
- AIPS 1:   spectrum. Default = ' ' =
- AIPS 1:   do not write spectrum. The
- AIPS 1:   file is written only if
- AIPS 1:   NPLOTS = 0
- AIPS 1: LTYPE   3   Type of labeling: 1 border,
- AIPS 1:   2 no ticks, 3 - 6 standard,
- AIPS 1:   7 - 10 only tick labels
- AIPS 1:   <0 -> no date/time
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: FACTOR   0   Scale plus signs by FACTOR
- AIPS 1: XYRATIO   0   XY plot ratio: 0 -> 1.636
- AIPS 1: BADDISK   *all 0   Disks to avoid for scratch
- AIPS 1: DOTV   1   > 0 Do plot on the TV, else
- AIPS 1:   make a plot file

- AIPS 1: GRCHAN   0   Graphics channel 0 => 1.
6. Use UVFLG to do any flagging necessary based on the bpass. OPCODE is FLAG.
   Other inputs should be self-explanatory and will vary depending on the flagging desired.
7. Be sure to delete BP1 from B and C when done (INEXT 'bp'; INVERS -1; EXTDES)

8. Use TVFLG to flag data interactively (do for A, B & C; make a new flag table). Once the
   tvflagger is running, you will want to switch the ALL-CH flag to 'all' and set the stokes
   flag to '1111' using the menu commands. You can then do additional smoothing if
   desired using the 'Enter Smooth Time' menu option before using the flagging commands.
   - AIPS 1: TVFLG: Task to edit UV data using the TV display and cursor
   - AIPS 1: Adverbs   Values   Comments
   - AIPS 1: --
   - AIPS 1: INNAME   '4C32_44D3-C'   UV data (name).
   - AIPS 1: INCLASS   'UVEVLA'   UV data (class).
   - AIPS 1: INSEQ   1   UV data (seq. #). 0 => high
   - AIPS 1: INDISK   2   Disk unit #.   0 => any
   - AIPS 1: DOCAT   -1   Catalog work file ?
   - AIPS 1: IN2SEQ   0   Sequence number of work file
   - AIPS 1: IN2DISK   0   Disk number of work file
   - AIPS 1: DOHIST   -1   Record flags in history file
   - AIPS 1: SOURCES   *all ' '   Source list
   - AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
   - AIPS 1: TIMERANG   *all 0   Time range to include
   - AIPS 1: STOKES   ' '   Stokes type to display
   - AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
   - AIPS 1: SELFREQ   -1   Frequency to select (MHz)
   - AIPS 1: FREQID   -1   Freq. ID to select.
   - AIPS 1: BIF   0   Lowest IF number 0=1
   - AIPS 1: EIF   0   Highest IF number
   - AIPS 1: BCHAN   128   Lowest channel number 0=>1
   - AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
   - #
   - AIPS 1: ECHAN   128   Highest channel number
   - AIPS 1: NCHAV   1   Number of chan. to average.
   - AIPS 1: CHINC   1   Channel incr. between maps.
   - AIPS 1: ANTENNAS   *all 0   Antennas to include
   - AIPS 1: BASELINE   *all 0   Baselines with ANTENNAS
   - AIPS 1: UVRANGE   0   0   UV range in kilolambda
   - AIPS 1: SUBARRAY   0   Subarray, 0 => all, but the
   - AIPS 1:   task is more efficient doing
   - AIPS 1:   one at a time
   - AIPS 1:   Cal. info for input:

- * • AIPS 1: DOCALIB   -1   > 0 calibrate data & weights
- • AIPS 1:   > 99 do NOT calibrate weights
- • AIPS 1: GAINUSE   0   CAL (CL or SN) table to apply
- • AIPS 1: DOPOL   -1   If >0 correct polarization.
- • AIPS 1: PDVER   0   PD table to apply (DOPOL>0)
- • AIPS 1: BLVER   -1   BL table to apply.
- • AIPS 1: FLAGVER   0   Flag table version 0 => high
- • AIPS 1:   < 0 no flagging on input
- • AIPS 1:   Used w single-source too
- • AIPS 1: OUTFGVER   2   Output FG table version
- • AIPS 1: DOBAND   -1   If >0 apply bandpass cal.
- • AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- • #
- • AIPS 1:   Method used depends on value
- • AIPS 1:   of DOBAND (see HELP file).
- • AIPS 1: BPVER   -1   Bandpass table version
- • AIPS 1: SMOOTH   *all 0   Smoothing function. See
- • AIPS 1:   HELP SMOOTH for details.
- • AIPS 1: DPARM   0   0   Control info:
- • AIPS 1:   0   0   (1) 0=amp, 1=phase, 2=rms,
- • AIPS 1:   0   10   3=rms/mean for initial
- • AIPS 1:   *rest 0   display, can choose any
- • AIPS 1:   interactively later
- • AIPS 1:   (2) > 0 include autocorr data
- • AIPS 1:   (3) >0 = baseline as ant pair
- • AIPS 1:   for B as x-axis only
- • AIPS 1:   (4) >0 => divide by source
- • AIPS 1:   IPOL flux
- • AIPS 1:   (5) Expand time ranges by
- • AIPS 1:   DPARM(5) in sec
- • AIPS 1:   (6) y-axis interval: give the
- • AIPS 1:   sample time in seconds.
- • AIPS 1:   default = 10 seconds.
- • AIPS 1:   (7) initial IF displayed, 0
- • AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- • #
- • AIPS 1:   => BIF, can choose BIF -
- • AIPS 1:   EIF interactively
- • AIPS 1:   (8) initial channel displayed
- • AIPS 1:   0 => BCHAN, can choose
- • AIPS 1:   BCHAN - ECHAN later
- • AIPS 1:   interactively

- AIPS 1:   (9,10) pixrange for initial
- AIPS 1:   TV load - can reset later
- AIPS 1:   interactively
- AIPS 1: BADDISK   *all 0   Disks to avoid for scratch
- AIPS 1:   and for master grid file.

9. Create a new BP 1 table for B and for C using BPASS (same inputs as before)

10. Check BP tables with POSSM (as before)

11. Calibrate the BP calibrator in B & C using a model (models can be retrieved with the task CALRD, see page 4-14 in the cookbook). Calsour should be the BP calibrator. Use in2d and get2n to load the model. Running calib will create SN 1 in B and C.
- AIPS 1: CALIB: Task to determine calibration for data.
- AIPS 1: Adverbs   Values   Comments
- AIPS 1: ---
- AIPS 1:   Input uv data.
- AIPS 1: INNAME   '4C12-50-A'   UV file name (name)
- AIPS 1: INCLASS   'UVEVLA'   UV file name (class)
- AIPS 1: INSEQ   1   UV file name (seq. #)
- AIPS 1: INDISK   1   UV file disk drive #
- AIPS 1:   Data selection (multisource):
- AIPS 1: CALSOUR   *all ' '   Calibrator sources
- AIPS 1: QUAL   -1   Calibrator qualifier -1=>all
- AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
- AIPS 1: SELFREQ   -1   Frequency to select (MHz)
- AIPS 1: FREQID   1   Freq. ID to select.
- AIPS 1: TIMERANG   *all 0   Time range to use.
- AIPS 1: ICHANSEL   *all 0   Array of start and stop chn
- AIPS 1:   numbers, plus a channel
- AIPS 1:   increment and IF to be used
- AIPS 1:   for channel selection in the
- AIPS 1:   averaging. See HELP ICHANSEL.
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   Default = center 75% of band.
- AIPS 1: ANTENNAS   *all 0   Antennas to select. 0=all
- AIPS 1: DOFIT   *all 0   Subset of ANTENNAS list for
- AIPS 1:   which solns are desired.
- AIPS 1: ANTUSE   *all 0   Mean gain is calculated
- AIPS 1:   (CPARM(2)>0) using only the
- AIPS 1:   listed antennas. See explain.

- AIPS 1: SUBARRAY   0   Subarray, 0=>all
- AIPS 1: UVRANGE   0   0   Range of uv distance for full
- AIPS 1:   weight
- AIPS 1: WTUV   0   Weight outside UVRANGE 0=0.
- AIPS 1: WEIGHTIT   0   Modify data weights function
- AIPS 1:   Cal. info for input:
- AIPS 1: DOCALIB   -1   > 0 calibrate data & weights
- AIPS 1:   > 99 do NOT calibrate weights
- AIPS 1: GAINUSE   0   CL table to apply.
- AIPS 1: DOPOL   -1   If >0 correct polarization.
- AIPS 1: PDVER   0   PD table to apply (DOPOL>0)
- AIPS 1: BLVER   -1   BL table to apply.
- AIPS 1: ==FLAGVER==   0   Flag table version
- AIPS 1: DOBAND   -1   If >0 apply bandpass cal.
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   Method used depends on value
- AIPS 1:   of DOBAND (see HELP file).
- AIPS 1: BPVER   -1   Bandpass table version
- AIPS 1: SMOOTH   *all 0   Smoothing function. See
- AIPS 1:   HELP SMOOTH for details.
- AIPS 1:
- AIPS 1:   CLEAN map. See HELP.
- AIPS 1: ==IN2NAME==   ' '   Cleaned map name (name)
- AIPS 1: IN2CLASS   ' '   Cleaned map name (class)
- AIPS 1: IN2SEQ   0   Cleaned map name (seq. #)
- AIPS 1: IN2DISK   0   Cleaned map disk unit #
- AIPS 1: INVERS   0   CC file version #.
- AIPS 1: NCOMP   *all 0   # comps to use for model.
- AIPS 1:   1 value per field
- AIPS 1: FLUX   0   Lowest CC component used.
- AIPS 1: NMAPS   0   No. Clean map files
- AIPS 1: CMETHOD   ' '   Modeling method:
- AIPS 1:   'DFT','GRID','   '
- AIPS 1: CMODEL   ' '   Model type: 'COMP','IMAG'
- AIPS 1:   'SUBI' (see HELP re images)
- AIPS 1: SMODEL   *all 0   Source model, 1=flux,2=x,3=y
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   See HELP SMODEL for models.
- AIPS 1:   Output uv data file.
- AIPS 1: OUTNAME   ' '   UV file name (name)

- AIPS 1: OUTCLASS ' '   UV file name (class)
- AIPS 1: OUTSEQ   0   UV file name (seq. #)
- AIPS 1: OUTDISK   1   UV file disk drive #
- AIPS 1: DOAPPLY   0   >= 0 write output if
- AIPS 1:   single source
- AIPS 1:   Solution control adverbs:
- AIPS 1: REFANT   22   Reference antenna
- AIPS 1: SOLINT   0   Solution interval (min)
- AIPS 1: SOLSUB   0   Solution subinterval
- AIPS 1: SOLMIN   0   Min solution interval
- AIPS 1: APARM   0   0   General parameters
- AIPS 1:   0   0   1=min. no. antennas
- AIPS 1:   0   2   2 > 0 => data divided
- AIPS 1:   *rest 0   3 > 0 => avg. RR,LL
- AIPS 1:   5 > 0 => avg. IFs.
- AIPS 1:   6=print level, 1=good,
- AIPS 1:   2 closure, 3 SNR
- AIPS 1:   7=SNR cutoff (0=>5)
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   8=max. ant. # (no AN)
- AIPS 1:   9 > 0 => pass failed soln
- AIPS 1:   10 < 99 cal output weights
- AIPS 1:   Phase-amplitude Parameters:
- AIPS 1: DOFLAG   0   Flag on closure error?
- AIPS 1: SOLTYPE   ' '   Soln type,' ','L1','GCON',
- AIPS 1:   'R', 'L1R', 'GCOR'
- AIPS 1: SOLMODE   'A&P'   Soln. mode: 'A&P','P','P!A',
- AIPS 1:   'GCON',
- AIPS 1: SOLCON   0   Gain constraint factor.
- AIPS 1: MINAMPER   10   Amplitude closure error
- AIPS 1:   regarded as excessive in %
- AIPS 1: MINPHSER   10   Phase closure error regarded
- AIPS 1:   as excessive in degrees
- AIPS 1: NORMALIZ   0   >0 => normalize gain:
- AIPS 1:   1 globally, 2 by subarray,
- AIPS 1:   3 by subarray,IF
- AIPS 1:   4 by subarray,IF,pol
- AIPS 1: CPARM   *all 0   Phase-amp. parameters
- AIPS 1:   1 = Min el for gain
- AIPS 1:   normalization (deg)
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **

- #
- AIPS 1:   2 > 0 normalize w median
- AIPS 1:   else use mean
- AIPS 1:   3 avg. amp. closure err
- AIPS 1:   4 avg. ph. closure err
- AIPS 1:   5 = 1 vector average
- AIPS 1:   channels, scalar avg
- AIPS 1:   between times
- AIPS 1:   >= 2 scalar average
- AIPS 1:   6 limit clipping in robust
- AIPS 1:   7 limit display of closure
- AIPS 1:   errors
- AIPS 1: SNVER   0   Output SN table, 0=>new table
- AIPS 1: ANTWT   *all 0   Ant. weights (0=>1.0)
- AIPS 1: GAINERR   *all 0   Std. Dev. of antenna gains.
- AIPS 1: BADDISK   *all 0   Disk no. not to use for
- AIPS 1:   scratch files.

12. Calibrate the phase calibrator in B&C (CALIB). This will create SN 2. Can use similar inputs for calib, but be sure to…
    - •Set IN2NAME and IN2CLASS to null ' ' so that a model is not use (will calibrate as a point source).
    - •Set calsour to the phase calibrator.

13. Get flux of phase calibrator using task GETJY and record value for B and for C (will run this twice, once for B and once for C) and then calculate the average (will need later). The calsour is your bandpass calibrator. The source is your phase calibrator.
    - AIPS 1: GETJY   Task to determine source flux densities.
    - AIPS 1: Adverbs   Values   Comments
    - AIPS 1: ---
    - AIPS 1: INNAME   ' '   Input UV file name (name)
    - AIPS 1: INCLASS   ' '   Input UV file name (class)
    - AIPS 1: INSEQ   0   Input UV file name (seq. #)
    - AIPS 1: INDISK   0   Input UV file disk unit #
    - AIPS 1: SOURCES   *all ' '   Source list to find fluxes
    - AIPS 1: SOUCODE   ' '   Source "Cal codes"
    - AIPS 1: CALSOUR   *all ' '   Cal sources for calibration
    - AIPS 1: QUAL   -1   Source qualifier -1=>all
    - AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
    - AIPS 1: BIF   0   Lowest IF number 0=1
    - AIPS 1: EIF   0   Highest IF number
    - AIPS 1: TIMERANG   *all 0   Time range of solutions.
    - AIPS 1: ANTENNAS   *all 0   Antennas to use
    - AIPS 1: SUBARRAY   0   Subarray, 0=>all

- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
- AIPS 1: SELFREQ   -1   Frequency to select (MHz)
- AIPS 1: FREQID   -1   Freq. ID to select.
- AIPS 1: SNVER   0   Input SN table, 0=>all.

14. Combine B&C databases (DBCON). Use getn to set the B database and get2n to set the C database. Outname should be something meaningful.
    - AIPS 1: DBCON   Task which concatenates two uv data bases .
    - AIPS 1: Adverbs   Values   Comments
    - AIPS 1: --
    - AIPS 1: INNAME   '3C120D2-B'   Input UV file name (name)
    - AIPS 1: INCLASS   'UVEVLA'   Input UV file name (class)
    - AIPS 1: INSEQ   1   Input UV file name (seq. #)
    - AIPS 1: INDISK   2   Input UV file disk unit #
    - AIPS 1: IN2NAME   '3C120D2-C'   2nd input file name.
    - AIPS 1: IN2CLASS 'UVEVLA'   2nd input file class.
    - AIPS 1: IN2SEQ   1   2nd input file seq. #
    - AIPS 1: IN2DISK   2   2nd input file disk number
    - AIPS 1: REWEIGHT   0   0   Weight factors.
    - AIPS 1: OUTNAME   '3C120D1-BC'   Output UV file name (name)
    - AIPS 1: OUTCLASS   ' '   Output UV file name (class)
    - AIPS 1: OUTSEQ   0   Output UV file name (seq. #)
    - AIPS 1: OUTDISK   2   Output UV file disk unit #.
    - AIPS 1: DOPOS   -1   -1   If (1,1) true (+1) check pos.
    - AIPS 1:   -1   -1   will shift second if nec.
    - AIPS 1:   -1   -1   If (2,1) true check freq.
    - AIPS 1:   -1   -1
    - AIPS 1: DOARRAY   -1   If true (+1) output data will
    - AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
    - #
    - AIPS 1:   be the same subarray as input
    - AIPS 1:   Forced to +1 for multi-source
    - AIPS 1: FQTOL   -1   > 0 tolerance to not renumber
    - AIPS 1:   FQs of dataset 2 (in kHz)
    - AIPS 1:   -1 => no renumbering.

BECOMES -8

15. Make a plotfile (POSSM) to look at the combined bandpass (use same inputs as before, but with the inname being the new, combined database). Make a plotfile of the combined bandpass by setting dotv -1.

GAINUSE = 2

∗

16. Print BP plot (LWPLA)
    - AIPS 1: LWPLA: Sends plot file(s) to a PostScript printer or file
    - AIPS 1: Adverbs   Values   Comments
    - AIPS 1: --
    - AIPS 1: INNAME   '3C225BD2-BC'   Image name (name)

- AIPS 1: INCLASS   'UVEVLA'   Image name (class)
- AIPS 1: INSEQ   1   Image name (seq. #)
- AIPS 1: INDISK   2   Disk drive #
- AIPS 1: PLVER   1   Version # of PL file. 0=>last
- AIPS 1: INVERS   2   PL file version #, upper
- AIPS 1:   limit if > PLVER
- AIPS 1: ASPMM   0   Arc sec. per mm. 0=self scale
- AIPS 1: LPEN   3   Pen width (dots).
- AIPS 1: RGBGAMMA   *all 0   Gamma correction to apply
- AIPS 1: FUNCTYPE   ' '   'NE', 'LG','NG', 'L2','N2',
- AIPS 1:   'SQ','NQ'
- AIPS 1:   else linear
- AIPS 1: DPARM   *all 0   (1,2) Clip recorded grays
- AIPS 1:   before FUNCTYPE (0 to 1)
- AIPS 1:   (3,4) After FUNCTYPE scale
- AIPS 1:   by g*DPARM(3) + DPARM(4)
- AIPS 1:   (5) Page orientation
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   0: fill page
- AIPS 1:   1: portrait 2: landscape
- AIPS 1:   (6) Paper type, for centering
- AIPS 1:   0: quarto,   1: legal,
- AIPS 1:   2: 4x5 in Slide,3: A3,
- AIPS 1:   4: A4,   5: 35 mm Slide
- AIPS 1:   6: 11 x 17
- AIPS 1:   1000*X + Y -> XxY inches
- AIPS 1:   (7) Font type, default
- AIPS 1:   Helvetica-Bold (see help)
- AIPS 1:   (8) Font size (in points,
- AIPS 1:   default 13).
- AIPS 1:   (9) Use CMYK color out rather
- AIPS 1:   than RGB if > 0. Do this
- AIPS 1:   for journals.
- AIPS 1: OUTFILE   ' '
- AIPS 1:   ' ' => print/delete
- AIPS 1:   otherwise write named file.
- AIPS 1: COPIES   1   Number of copies if going
- AIPS 1:   directly to a printer
- AIPS 1: DODARK   1   Paint dark vectors as "dark"
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #

- AIPS 1: OFMFILE   *all ' '   Color grey scales....
- AIPS 1: DOCOLOR   0   Use PLCOLORS ?
- AIPS 1: PLCOLORS   *all 0   Line, character, background
- AIPS 1:   colors - see HELP.
17. Copy BP table from the combined database to A using task TACOP.
18. Set flux of phase calibrator in A (use task SETJY). Use average of the flux found in step #13. Sources should be set to your phase calibrator. Set the average flux as I in the ZEROSP adverb. For example, if the average flux of your phase calibrator is 2.11 Jy, then ZEROSP = 2.11, 0, 0, 0
   - AIPS 1: SETJY   Task to enter source info into source (SU) table.
   - AIPS 1: Adverbs   Values   Comments
   - AIPS 1: ---
   - AIPS 1: INNAME   ' '   Input image name (name)
   - AIPS 1: INCLASS   ' '   Input image name (class)
   - AIPS 1: INSEQ   0   Input image name (seq. #)
   - AIPS 1: INDISK   0   Input image disk unit #
   - AIPS 1: SOURCES   *all ' '   Sources to modify.
   - AIPS 1: QUAL   -1   Source qualifier -1=>all
   - AIPS 1: BIF   0   Low IF # for flux density
   - AIPS 1: EIF   0   High IF # for flux density
   - AIPS 1: ZEROSP   2.11   *rest 0   I,Q,U,V flux density (Jy)
   - AIPS 1:   (at 1 GHz if OPTYP='SPEC)
   - AIPS 1: SPECINDX   0   Spectral index
   - AIPS 1: SPECURVE   *all 0   Spectral index curvature
   - AIPS 1: OPTYPE   ' '   '   ' => use other adverbs
   - AIPS 1:   for required operation
   - AIPS 1:   'SPEC' => as ' ' but ZEROSP
   - AIPS 1:   is at 1 GHz not freq of BIF
   - AIPS 1:   'CALC' => determine
   - AIPS 1:   3C286/3C48/1934 fluxes from
   - AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
   - #
   - AIPS 1:   standard formulae
   - AIPS 1:   'REJY' => reset source
   - AIPS 1:   fluxes to zero.
   - AIPS 1:   'REVL' => reset velocity
   - AIPS 1:   to zero
   - AIPS 1:   'RESE' => reset fluxes &
   - AIPS 1:   velocities to zero.
   - AIPS 1: CALCODE   ' '   New calibrator code:
   - AIPS 1:   '----' => change to blank
   - AIPS 1: SYSVEL   0   Velocity of source (km/s)

- AIPS 1: RESTFREQ   0   0   Line rest frequency (Hz)
- AIPS 1: VELTYP   ' '   Velocity type 'LSR,'HELIO'
- AIPS 1: VELDEF   ' '   Velocity definition 'RADIO',
- AIPS 1:   'OPTICAL'
- AIPS 1: FREQID   -1   FQ table entry to use for
- AIPS 1:   velocity information and
- AIPS 1:   'CALC' option
- AIPS 1: APARM   *all 0   (1): Pixel to which SYSVEL
- AIPS 1:   refers (0=>1)
- AIPS 1:   (2): Only for 'CALC' option:
- AIPS 1:   <= 0 => use best VLA
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   values (2010)
- AIPS 1:   1 => use VLA 1999.2
- AIPS 1:   values = default before
- AIPS 1:   2/15/10 in SETJY
- AIPS 1:   2 => use VLA 1995.2
- AIPS 1:   values
- AIPS 1:   3 => use oldest VLA
- AIPS 1:   values (1990)
- AIPS 1:   4 => use Baars values
- AIPS 1:   (any) for 1934-638, the
- AIPS 1:   ATCA value of 30Jul94.
- AIPS 1:   (3): Only for 'CALC' option:
- AIPS 1:   multiply the calculated
- AIPS 1:   fluxes by APARM(3) with
- AIPS 1:   0 -> 1

19. Calibrate the phase calibrator in A (use task CALIB). Your previous inputs should be correct, just change your getn file to A (check that the source listed is the phase calibrator and that no model is being used). Sources is your target source. Calsour is your phase calibrator. This will create SN 1 in the A database.

20. Interpolate your target source from your phase calibrator using task CLCAL
- AIPS 1: CLCAL   Task to manage SN and CL calibration tables
- AIPS 1: Adverbs   Values   Comments
- AIPS 1: --
- AIPS 1: <mark>INNAME</mark>   '4C32_44D3-A'   Input UV file name (name)
- AIPS 1: INCLASS   'UVEVLA'   Input UV file name (class)
- AIPS 1: INSEQ   1   Input UV file name (seq. #)
- AIPS 1: INDISK   2   Input UV file disk unit #
- AIPS 1: <mark>SOURCES</mark>   'J1326+3154'   Source list to calibrate
- AIPS 1:   *rest ' '

- AIPS 1: SOUCODE   ' '   Source "Cal codes"
- AIPS 1: CALSOUR   'J1331+3030'   Cal sources for calibration
- AIPS 1:   *rest ' '
- AIPS 1: QUAL   -1   Source qualifier -1=>all
- AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
- AIPS 1: TIMERANG   *all 0   Time range to calibrate
- AIPS 1: SUBARRAY   0   Subarray, 0=>all,
- AIPS 1: ANTENNAS   *all 0   Antennas selected, 0=> all
- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
- AIPS 1: SELFREQ   -1   Frequency to select (MHz)
- AIPS 1: FREQID   1   Freq. ID to select.
- AIPS 1: OPCODE   ' '   Operation 'MERG','CALI',
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- AIPS 1: #
- AIPS 1:   'CALP'; ' ' => 'CALI'
- AIPS 1: INTERPOL   ' '   Interpolation function,
- AIPS 1:   choices are: '2PT','SIMP',
- AIPS 1:   'AMBG','CUBE','SELF','POLY',
- AIPS 1:   'SELN'; see HELP for details
- AIPS 1: CUTOFF   0   Interpolation limit in
- AIPS 1:   time (min); 0=> no limit.
- AIPS 1: SAMPTYPE   ' '   Smoothing function
- AIPS 1: BPARM   *all 0   Smoothing parameters
- AIPS 1: ICUT   0.1   Cutoff for functional forms
- AIPS 1: DOBLANK   0   Blanked value interpolation
- AIPS 1: DOBTWEEN   1   > 0 -> smooth all sources
- AIPS 1:   together; else separate them
- AIPS 1: SMOTYPE   ' '   Data to smooth
- AIPS 1: SNVER   1   Input SN table, 0=>all.
- AIPS 1: INVERS   0   Upper SN table vers in a
- AIPS 1:   range. 0=>SNVER
- AIPS 1: GAINVER   0   Input Cal table 0=>high
- AIPS 1: GAINUSE   0   Output CAL table 0=>high+1
- AIPS 1: REFANT   19   Reference antenna 0=>pick.
- AIPS 1: BADDISK   *all 0   Disks to avoid for scratch

21. Make a POSSM plot for the target source to check. Be sure to set sources for the target source. APARM = 0

- AIPS 1: POSSM   Task to plot total and cross-power spectra.
- AIPS 1: Adverbs   Values   Comments
- AIPS 1: --
- AIPS 1: USERID   0   User number - ignored
- AIPS 1: INNAME   '3C225BD1-A'   Input UV file name (name)

- AIPS 1: INCLASS   'UVEVLA'   Input UV file name (class)
- AIPS 1: INSEQ   1   Input UV file name (seq. #)
- AIPS 1: INDISK   2   Input UV file disk unit #
- AIPS 1: SOURCES   *all ' '   Source list
- AIPS 1: QUAL   -1   Source qualifier -1=>all
- AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
- AIPS 1: SELFREQ   -1   Frequency to select (MHz)
- AIPS 1: FREQID   -1   Freq. ID to select.
- AIPS 1: UVRANGE   0   0   UV range to be plotted
- AIPS 1: TIMERANG   *all 0   Time range to be plotted
- AIPS 1: STOKES   ' '   Stokes type(s) to select.
- AIPS 1: BIF   0   Lowest IF number 0=>all
- AIPS 1: EIF   0   Highest IF number 0=>all
- AIPS 1: BCHAN   1   Lowest channel number 0=>all
- AIPS 1: ECHAN   0   Highest channel number 0=>all
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: SUBARRAY   0   Subarray, 0=>1
- AIPS 1: ANTENNAS   *all 0   Antennas to select
- AIPS 1: BASELINE   *all 0   Baselines with ANTENNAS
- AIPS 1: DOCALIB   1   > 0 calibrate data & weights
- AIPS 1:   > 99 do NOT calibrate weights
- AIPS 1: GAINUSE   2   CL (or SN) table to apply
- AIPS 1: DOPOL   -1   If >0 correct polarization.
- AIPS 1: PDVER   0   PD table to apply (DOPOL>0)
- AIPS 1: BLVER   -1   BL table to apply.
- AIPS 1: FLAGVER   0   Flag table version
- AIPS 1: DOBAND   1   If >0 apply bandpass cal.
- AIPS 1:   Method used depends on value
- AIPS 1:   of DOBAND (see HELP file).
- AIPS 1: BPVER   1   Bandpass table version
- AIPS 1: SMOOTH   0   *rest 0   Smoothing function. See
- AIPS 1:   HELP SMOOTH for details.
- AIPS 1: SHIFT   0   0   Position shift:
- AIPS 1:   RA, Dec (arcsec)
- AIPS 1:   0 => no shift
- AIPS 1: APARM   *all 0   Control information:
- AIPS 1:   1: < 0 => scalar average
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   >= 0 => vector average

- AIPS 1:   2: = 0 => self-scale
- AIPS 1:   > 0 => fixed scale
- AIPS 1:   (use APARM(3-6))
- AIPS 1:   3: min. amplitude
- AIPS 1:   4: max. amplitude
- AIPS 1:   5: min. phase (degrees)
- AIPS 1:   6: max. phase
- AIPS 1:   7: x-axis labelling
- AIPS 1:   = 0 = > in channels.
- AIPS 1:   = 1 = > in Hz (or secs
- AIPS 1:   if corr. fn)
- AIPS 1:   = 2 = > in m/s
- AIPS 1:   8: = 0 => plot cross power
- AIPS 1:   = 1 => plot total power
- AIPS 1:   = 2 => plot BP table
- AIPS 1:   version BPVER
- AIPS 1:   = 3 => plot ACF
- AIPS 1:   = 4 => plot XCF
- AIPS 1:   = 5 => plot BD table
- AIPS 1:   version BPVER
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   = 6 => plot PD table
- AIPS 1:   version BPVER
- AIPS 1:   = 7 => plot CP table
- AIPS 1:   version BPVER
- AIPS 1:   = 8 => plot CP table / I
- AIPS 1:   version BPVER
- AIPS 1:   9: > 0 => plot several IF's
- AIPS 1:   and/or polarizations
- AIPS 1:   together as though one
- AIPS 1:   long spectrum (see HELP)
- AIPS 1:   10: > 0 => reverse direction
- AIPS 1:   of plotted spectrum, so
- AIPS 1:   velocity increases to
- AIPS 1:   right.
- AIPS 1: CODETYPE   ' '   'A&P ', 'AMP ', 'PHAS',
- AIPS 1:   'R&I ', 'REAL', 'IMAG'
- AIPS 1:   'LA&P', 'LAMP'
- AIPS 1:   other => 'A&P '
- AIPS 1: POLPLOT   ' '   Option to display various
- AIPS 1:   combinations of polzns to

- AIPS 1:   plot: 'RL/RR', 'RL/LL',
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   'LR/RR', 'LR/LL', 'RR/LL'
- AIPS 1:   'LL/RR'; other = don't use
- AIPS 1:   this option.
- AIPS 1: SOLINT   0   If SOLINT > 0 then it enables
- AIPS 1:   the user to make multiple
- AIPS 1:   plots per pass of POSSM.
- AIPS 1:   It defines the averaging time
- AIPS 1:   for each individual plot.
- AIPS 1:   Task will start at TIMERANG
- AIPS 1:   and make a plot for every
- AIPS 1:   SOLINT minutes. If SOLINT
- AIPS 1:   = -1 will do the same but
- AIPS 1:   will do scan averages if NX
- AIPS 1:   table is present.
- AIPS 1: NPLOTS   0   Number of plots per page
- AIPS 1: BPARM   *all 0   More control information:
- AIPS 1:   1: If = 1 divide by 'channel
- AIPS 1:   0' before plotting data.
- AIPS 1:   0 => do not divide.
- AIPS 1:   2: Start chn. of 'channel 0'
- AIPS 1:   (0 => determined by POSSM)
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   3: Stop chn. of 'channel 0'
- AIPS 1:   (0 => determined by POSSM)
- AIPS 1:   4: ignore spectrum when ampl.
- AIPS 1:   channel 0 < BPARM(4) Jy
- AIPS 1:   5: scale LOG10 plots by B(5)
- AIPS 1:   6-9: unused
- AIPS 1:   10: =1 => don't write header
- AIPS 1:   info when writing to outfile
- AIPS 1:   useful for appending several
- AIPS 1:   spectra into a single outfile
- AIPS 1:   [see EXPLAIN POSSM]
- AIPS 1: OUTTEXT   ' '
- AIPS 1:   Filename in which to write
- AIPS 1:   spectrum. Default = ' ' =
- AIPS 1:   do not write spectrum. The
- AIPS 1:   file is written only if

- AIPS 1:   NPLOTS = 0
- AIPS 1: LTYPE   3   Type of labeling: 1 border,
- AIPS 1:   2 no ticks, 3 - 6 standard,
- AIPS 1:   7 - 10 only tick labels
- AIPS 1:   <0 -> no date/time
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: FACTOR   0   Scale plus signs by FACTOR
- AIPS 1: XYRATIO   0   XY plot ratio: 0 -> 1.636
- AIPS 1: BADDISK   *all 0   Disks to avoid for scratch
- AIPS 1: DOTV   1   > 0 Do plot on the TV, else
- AIPS 1:   make a plot file
- AIPS 1: GRCHAN   0   Graphics channel 0 => 1.

22. If everything looks good, you are ready for self-cal. Split off the target source in A to form a new single-source database (use task SPLIT).

- AIPS 1: SPLIT   Task to split multi-source uv data to single source
- AIPS 1: Adverbs   Values   Comments
- AIPS 1: --
- AIPS 1:   also works on single files.
- AIPS 1: INNAME   '3C225BD1-A'   Input UV file name (name)
- AIPS 1: INCLASS   'UVEVLA'   Input UV file name (class)
- AIPS 1: INSEQ   1   Input UV file name (seq. #)
- AIPS 1: INDISK   2   Input UV file disk unit #
- AIPS 1: SOURCES   'J094215+134549'   Source list
- AIPS 1:   *rest ' '
- AIPS 1: QUAL   -1   Source qualifier -1=>all
- AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
- AIPS 1: TIMERANG   *all 0   Time range to copy
- AIPS 1: STOKES   ' '   Stokes type to pass.
- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
- AIPS 1: SELFREQ   -1   Frequency to select (MHz)
- AIPS 1: FREQID   1   Freq. ID to select.
- AIPS 1: BIF   0   Lowest IF number 0=>all
- AIPS 1: EIF   0   Highest IF number 0=>all
- AIPS 1: BCHAN   1   Lowest channel number 0=>all
- AIPS 1: ECHAN   0   Highest channel number
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: SUBARRAY   0   Subarray, 0=>all
- AIPS 1: DOCALIB   1   > 0 calibrate data & weights
- AIPS 1:   > 99 do NOT calibrate weights
- AIPS 1: GAINUSE   2   CL (or SN) table to apply

- AIPS 1: DOPOL   -1   If >0 correct polarization.
- AIPS 1: PDVER   0   PD table to apply (DOPOL>0)
- AIPS 1: BLVER   -1   BL table to apply.
- AIPS 1: FLAGVER   0   Flag table version
- AIPS 1: DOBAND   1   If >0 apply bandpass cal.
- AIPS 1:   Method used depends on value
- AIPS 1:   of DOBAND (see HELP file).
- AIPS 1: BPVER   1   Bandpass table version
- AIPS 1: SMOOTH   *all 0   Smoothing function. See
- AIPS 1:   HELP SMOOTH for details.
- AIPS 1: OUTCLASS ' '   Output UV file name (class)
- AIPS 1: OUTSEQ   0   Output UV file name (seq. #)
- AIPS 1: OUTDISK   2   Output UV file disk unit #.
- AIPS 1: DOUVCOMP   -1   1 (T) => compressed data
- AIPS 1: APARM   *all 0   Control information:
- AIPS 1:   1 = 1 => avg. freq. in IF
- AIPS 1:   multi-channel out
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   = 2 => avg. freq. in IF
- AIPS 1:   single channel out
- AIPS 1:   = 3 => avg IF's also
- AIPS 1:   2 = Input avg. time (sec)
- AIPS 1:   3 > 0 => Drop subarrays
- AIPS 1:   4 > 0 => calibrate weights
- AIPS 1:   5 = 0 pass only xc data
- AIPS 1:   = 1 pass xc and ac data
- AIPS 1:   = 2 pass only ac data
- AIPS 1:   6 > 0 add full source name
- AIPS 1:   to header
- AIPS 1: NCHAV   1   Number of chan. to average.
- AIPS 1:   (used if APARM(1) = 1)
- AIPS 1:   <= 0 -> ALL
- AIPS 1: CHINC   1   Channel incr. between output
- AIPS 1:   channels (used if APARM(1)=1)
- AIPS 1: ICHANSEL   *all 0   Array of channel start, stop,
- AIPS 1:   and increment numbers and IF
- AIPS 1:   number to be used when
- AIPS 1:   averaging in frequency.
- AIPS 1:   (used if APARM(1) = 2, 3)
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #

- AIPS 1: BADDISK   *all 0   Disks to avoid for scratch

23. Run UVLSF on the split database to create a continuum "basfit" file. This task will also output a .uvlsf file which can be deleted. ICHANSEL defines the range of channels to use for the continuum (use the ones below unless they contain an absorption feture).

- AIPS 1: UVLSF   Least squares fit baseline and subtracts from uv data.
- AIPS 1: Adverbs   Values   Comments
- AIPS 1: --
- AIPS 1: INNAME   'J1642+3948'   Input UV file name (name)
- AIPS 1: INCLASS   'SPLIT'   Input UV file name (class)
- AIPS 1: INSEQ   1   Input UV file name (seq. #)
- AIPS 1: INDISK   2   Input UV file disk unit #
- AIPS 1: SOURCES   'J0433+0521'   Source name
- AIPS 1:   *rest ' '
- AIPS 1: QUAL   -1   Calibrator qualifier -1=>all
- AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
- AIPS 1: TIMERANG   *all 0   Time range to use
- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)
- AIPS 1: SELFREQ   -1   Frequency to select (MHz)
- AIPS 1: FREQID   -1   Freq. ID to select.
- AIPS 1: SUBARRAY   0   Sub-array, 0=>all
- AIPS 1: BIF   0   Low IF number to do
- AIPS 1: EIF   0   Highest IF number to do
- AIPS 1: DOCALIB   -1   > 0 calibrate data & weights
- AIPS 1:   > 99 do NOT calibrate weights
- AIPS 1: GAINUSE   2   CL (or SN) table to apply
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: DOPOL   -1   If >0.5 correct polarization.
- AIPS 1: PDVER   0   PD table to apply (DOPOL>0)
- AIPS 1: BLVER   -1   BL table to apply.
- AIPS 1: FLAGVER   0   Flag table version
- AIPS 1: DOBAND   -1   If >0.5 apply bandpass cal.
- AIPS 1:   Method used depends on value
- AIPS 1:   of DOBAND (see HELP file).
- AIPS 1: BPVER   1   Bandpass table version
- AIPS 1: SMOOTH   *all 0   Smoothing function. See
- AIPS 1:   HELP SMOOTH for details.
- AIPS 1: DOACOR   -1   Include autocorrelations?
- AIPS 1: OUTNAME   ' '   Output UV file name (name)
- AIPS 1: OUTCLASS   ' '   Output UV file name (class)
- AIPS 1: OUTSEQ   0   Output UV file name (seq. #)
- AIPS 1: OUTDISK   2   Output UV file disk unit #.

- AIPS 1: BCHAN   1   Lowest channel to write
- AIPS 1: ECHAN   0   Highest channel to write
- AIPS 1: ICHANSEL   40   80   Select channels to fit: NOTE
- AIPS 1:   1   1   this is start,end,increment
- AIPS 1:   170   215   and IF for each region
- AIPS 1:   1   1   *rest 0
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: ORDER   1   Order of fit line (0 -> DC)
- AIPS 1:   < 0 => add contiuum of
- AIPS 1:   CHANNEL back to line data
- AIPS 1: DOOUTPUT   1   > 0 => write fit baseline as
- AIPS 1:   a continuum uv data base
- AIPS 1: CHANNEL   0   Channel of fit to be written
- AIPS 1:   as continuum: 0 -> reference
- AIPS 1: FLUX   0   Flag data if residual flux in
- AIPS 1:   any fit channel is > FLUX
- AIPS 1:   0 -> 10**20
- AIPS 1: CUTOFF   0   Flag data if RMS of residual
- AIPS 1:   in fit channels > CUTOFF
- AIPS 1:   0 -> 10**20
- AIPS 1: SHIFT   0   0   Shift in asec at ref position

24. Use task IMAGR to create a clean map. The input file is the basfit file created in the previous step. Once the image loads on the TV, use the TVBOX menu option to draw a box around the target source and then CONTINUE CLEAN (until the area inside the box looks "empty"). STOP CLEAN will end the cleaning (or when the max clean components are reached, cleaning will automatically stop. This task will output a clean map (ICL file). NOTE: It is very important to set the CELLSIZE input correctly. The CELLSIZE should be set so that the beam is at least 2.5 to 3 pixels wide. You can get the beam size in the header of the ICL file produced by IMAGR.

- AIPS 1: IMAGR: Wide field imaging/Clean task
- AIPS 1: Adverbs   Values   Comments
- AIPS 1: ---
- AIPS 1: INNAME   'J1326+3154'   Input UV data (name)
- AIPS 1: INCLASS   'BASFIT'   Input UV data (class)
- AIPS 1: INSEQ   4   Input UV data (seq. #)
- AIPS 1: INDISK   2   Input UV data disk drive #
- AIPS 1: SOURCES   'J1326+3154'   Source name
- AIPS 1:   *rest ' '
- AIPS 1: QUAL   -1   Calibrator qualifier -1=>all
- AIPS 1: CALCODE   ' '   Calibrator code '   '=>all
- AIPS 1: TIMERANG   *all 0   Time range to use
- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)

- AIPS 1: SELFREQ   -1   Frequency to select (MHz)
- AIPS 1: FREQID   1   Freq. ID to select.
- AIPS 1: SUBARRAY   0   Sub-array, 0=>all
- AIPS 1: ANTENNAS   *all 0   Antennas to plot
- AIPS 1: BASELINE   *all 0   Baselines with ANTENNAS
- AIPS 1: DOCALIB   -1   > 0 calibrate data & weights
- AIPS 1:   > 99 do NOT calibrate weights
- AIPS 1: GAINUSE   2   CL (or SN) table to apply
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: DOPOL   -1   If >0.5 correct polarization.
- AIPS 1: PDVER   0   PD table to apply (DOPOL>0)
- AIPS 1: BLVER   -1   BL table to apply.
- AIPS 1: FLAGVER   0   Flag table version
- AIPS 1: DOBAND   -1   If >0.5 apply bandpass cal.
- AIPS 1:   Method used depends on value
- AIPS 1:   of DOBAND (see HELP file).
- AIPS 1: BPVER   -1   Bandpass table version
- AIPS 1: SMOOTH   *all 0   Smoothing function. See
- AIPS 1:   HELP SMOOTH for details.
- AIPS 1: STOKES   ''   Stokes parameters (see HELP)
- AIPS 1: BCHAN   1   Low freq. channel 0 for cont.
- AIPS 1: ECHAN   0   Highest freq channel
- AIPS 1: CHANNEL   0   Restart channel number
- AIPS 1: NCHAV   0   Number of chan. to average.
- AIPS 1: CHINC   1   Channel incr. between maps.
- AIPS 1: BIF   0   First IF in average.
- AIPS 1: EIF   0   Last IF in average.
- AIPS 1: OUTNAME   ''   Output image name (name)
- AIPS 1: OUTDISK   2   Output image disk drive #
- AIPS 1: OUTSEQ   0   Output seq. no.
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: OUTVER   1   CC ver. no (Continuum only)
- AIPS 1:   *** SET OUTVER ON RESTARTS
- AIPS 1: IN2NAME   ''   UV work file name
- AIPS 1: IN2CLASS   ''   UV work file class
- AIPS 1: IN2SEQ   1   UV work file seq
- AIPS 1:   *** SET TO KEEP WORK FILE
- AIPS 1: IN2DISK   1   UV work file disk
- AIPS 1: CELLSIZE   0.4   0.4   (X,Y) size of grid in asec
- AIPS 1: IMSIZE   512   512   Minimum image size

- AIPS 1: NFIELD   1   Number of fields (max 4096)
- AIPS 1: DO3DIMAG   -1   > 0 => use different tangent
- AIPS 1:   points for each field
- AIPS 1: FLDSIZE   *all 0   Clean size of each field.
- AIPS 1: RASHIFT   *all 0   RA shift per field (asec)
- AIPS 1: DECSHIFT   *all 0   DEC shift per field (asec)
- AIPS 1: UVTAPER   0   0   (U,V) Gaussian taper
- AIPS 1:   units are kilo-lambda
- AIPS 1: UVRANGE   0   0   Min & max baseline (klambda)
- AIPS 1: GUARD   0   0   x,y guard band fractional
- AIPS 1:   radius
- AIPS 1: ROTATE   0   Rotate image CCW from N by
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   ROTATE degrees
- AIPS 1: ZEROSP   *all 0   0-spacing fluxes and weights
- AIPS 1:   SEE HELP!!
- AIPS 1: UVWTFN   ' '   UV dist. weight function
- AIPS 1: UVSIZE   0   0   Array size for doing uniform
- AIPS 1:   weights. 0 -> actual field
- AIPS 1:   size.
- AIPS 1: ROBUST   0   Robustness power: -5 -> pure
- AIPS 1:   uniform weights, 5 => natural
- AIPS 1: UVBOX   0   Additional rows and columns
- AIPS 1:   used in weighting.
- AIPS 1: UVBXFN   1   Box function type when UVBOX
- AIPS 1:   > 0. 0 -> 1 round pill box.
- AIPS 1: XTYPE   5   Conv. function type in x
- AIPS 1:   default spheroidal
- AIPS 1: YTYPE   5   Conv. function type in y
- AIPS 1:   default spheroidal
- AIPS 1: XPARM   *all 0   Conv. function parms for x
- AIPS 1: YPARM   *all 0   Conv. function parms for y
- AIPS 1: <mark>NITER</mark>   2000   Maximum # of Clean components
- AIPS 1: BCOMP   *all 0   Begin at BCOMP component
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   Specify for each field.
- AIPS 1: ALLOKAY   0   For restart: > 0 => beams
- AIPS 1:   okay, > 1 => work file too
- AIPS 1: NBOXES   0   Number of boxes for Clean
- AIPS 1:   NB: field 1 only.

- AIPS 1: CLBOX   *all 0   Four coordinates for each box
- AIPS 1: BOXFILE   *all ' '   Input file of field params
- AIPS 1:   and Clean boxes; ' ' => use
- AIPS 1:   FLDSIZE, RASHIFT, DECSHIFT,
- AIPS 1:   NBOXES, CLBOX only.
- AIPS 1: OBOXFILE   *all ' '   Output file for final Clean
- AIPS 1:   boxes
- AIPS 1: GAIN   0.1   Clean loop gain
- AIPS 1: FLUX   0   Minimum Clean component (Jy)
- AIPS 1: MINPATCH   51   Min. BEAM half-width in AP.
- AIPS 1: BMAJ   0   FWHM(asec) major axis Clean
- AIPS 1:   restoring beam.
- AIPS 1: BMIN   0   FWHM(asec) minor axis Clean
- AIPS 1:   restoring beam.
- AIPS 1: BPA   0   Clean beam position angle
- AIPS 1: OVERLAP   0   1 => restore components to
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   overlapped fields, >=2=>
- AIPS 1:   expect overlaps in Cleaning
- AIPS 1: ONEBEAM   0   > 0 use only 1 dirty beam
- AIPS 1:   per scale in multi-facet
- AIPS 1:   Cleans
- AIPS 1: OVRSWTCH   0   Not 0 => switch from OVERLAP
- AIPS 1:   >= 2 to OVERLAP 1 - see HELP
- AIPS 1: PHAT   0   Prussian hat height.
- AIPS 1: FACTOR   0   Speedup factor see HELP
- AIPS 1: CMETHOD   ' '   Modeling method:
- AIPS 1:   'DFT','GRID','   '
- AIPS 1: IMAGRPRM   *all 0   Task enrichment parameters
- AIPS 1:   (1) Antenna diameter (m)
- AIPS 1:   (2) Source Spectral index
- AIPS 1:   (3) Frequency scaling factor
- AIPS 1:   (4) > 0 -> SDI Clean factor
- AIPS 1:   (5) >0 => scale residuals
- AIPS 1:   (6) Half-width in x of box
- AIPS 1:   (7) Half-width in y of box
- AIPS 1:   (8) Filter components whose
- AIPS 1:   neighborhood is weaker than
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   IMAGRPRM(8) Jy. 0 -> don't

- AIPS 1:   (9) Radius in pixels for the
- AIPS 1:   IMAGRPRM(8) test.
- AIPS 1:   (10) multiplier of image size
- AIPS 1:   to get beam size: 0 => 2;
- AIPS 1:   2, 1, 0.5 0.25 supported
- AIPS 1:   (11-16) Multi-scale controls
- AIPS 1:   (17) spectral index radius
- AIPS 1:   0 -> no correction
- AIPS 1:   (18) Limit grids (see help)
- AIPS 1:   (19) Dynamic range limit
- AIPS 1:   (20) Retry factor (see help)
- AIPS 1: IM2PARM   *all 0   Yet more parameters:
- AIPS 1:   (1) Auto boxes: allowed #
- AIPS 1:   (2)   : island level
- AIPS 1:   (3)   : peak required
- AIPS 1:   (4)   : limit wrt max
- AIPS 1:   (5)   : extend boxes
- AIPS 1:   (6)   : edge skip
- AIPS 1:   (7) reset boxes for next chan
- AIPS 1:   (11) baseline-dependent avg
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1:   max time in sec
- AIPS 1:   (12) field size 0 -> infinite
- AIPS 1: NGAUSS   0   Number of scales to use
- AIPS 1: WGAUSS   *all 0   Scales in arc sec >= 0
- AIPS 1: FGAUSS   *all 0   Minimum flux for each resol.
- AIPS 1: MAXPIXEL   20000   Maximum pixels searched in
- AIPS 1:   each major cycle.
- AIPS 1: IN3NAME   ''   Spectral index image name
- AIPS 1: IN3CLASS ''   Spectral index image class
- AIPS 1: IN3SEQ   0   Spectral index image sequence
- AIPS 1:   number
- AIPS 1: IN3DISK   0   Spectral index image disk
- AIPS 1: IN4NAME   ''   Spectral curvature name
- AIPS 1: IN4CLASS ''   Spectral curvature class
- AIPS 1: IN4SEQ   0   Spectral curvature sequence
- AIPS 1:   number
- AIPS 1: IN4DISK   0   Spectral curvature disk
- AIPS 1: FQTOL   -1   Frequency tolerance in kHz
- AIPS 1:   (primary beam & spec index)
- AIPS 1: DOTV   1   Display residuals on TV ?

- AIPS 1:   Start with field = DOTV
- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **
- #
- AIPS 1: GRCHAN   0   Graphics channel of boundary
- AIPS 1: BADDISK   *all 0   Disks to avoid for scratch.

25. Look at the header of the ICL file. Record the maximum flux (signal peak) and the beam size. Make sure the cellsize from imagr is small enough so that the beam is at least 2.5 x cellsize.

26. Use the verb TVWINDOW to draw a large rectangle in the noise area of the image (anywhere away from the source is fine). Use IMSTAT to get and record the value of the rms noise. Calculate the signal-to-noise ratio.

27. Run CCMRG on the clean map file to merge clean components in the same pixel. INVERS and OUTVERS should both be 1 (unless you have more than one CC table for some odd reason).
    - AIPS 1: CCMRG: Task to merge CC components at the same pixel.
    - AIPS 1: Adverbs   Values   Comments
    - AIPS 1: --
    - AIPS 1: INNAME   'J1326+3154'   Main input file (name).
    - AIPS 1: INCLASS   'ICL001'   Main input file (class).
    - AIPS 1: INSEQ   4   Main input file (seq. #).
    - AIPS 1:   0 => high
    - AIPS 1: INDISK   2   Disk unit #.   0 => any
    - AIPS 1: INVERS   1   Input CC file version no.
    - AIPS 1: OUTVERS   1   Output CC file version.
    - AIPS 1: BADDISK   *all 0   Disks to avoid for scratch

28. Use PRTCC to view a listing of the clean components. Record the first negative clean component (found at end of list).
    - AIPS 1: PRTCC: Task to print any clean component table extension files
    - AIPS 1: Adverbs   Values   Comments
    - AIPS 1: --
    - AIPS 1: INNAME   'J1326+3154'   Image name (name)
    - AIPS 1: INCLASS   'ICL001'   Image name (class)
    - AIPS 1: INSEQ   3   Image name (seq. #)
    - AIPS 1: INDISK   2   Disk drive #
    - AIPS 1: INVERS   1   CC file ver. #
    - AIPS 1: BPRINT   1   First row number to print
    - AIPS 1: EPRINT   0   Last row number to print
    - AIPS 1: XINC   1   Increment between rows
    - AIPS 1: DOCRT   1   If > 0, write to CRT

- AIPS 1:   > 72 => terminal width
- AIPS 1: OUTPRINT ''
- AIPS 1:   Printer disk file to save
- AIPS 1: DOCELL   0   If > 0, print pos. in cells

29. Run CALIB to selfcal. It is important to set the following inputs (check all inputs before running).
    - CALSOUR   [target source]
    - ICHANSEL   0
    - IN2D   [disk that contains the clean map ICL file from step #24]
    - GET2N   [catalog number of the clean map ICL file]
    - NCOMP   n,0   [where n is the last positive clean component]
    - SOLMOD   'p'
    - CPARM   0
    - APARM(7)   3
    - SOLINT   1   [may want to change depending on data]
    - REFANT

30. Use SNPLT to check SN table generated by CALIB.

31. If SN table looks good, use TACOP to copy the self-cal SN table to the .SPLIT database created in step #22. And then repeat steps #23 through #31 (be sure to apply the SN table by setting DOCALIB = 1 and GAINUSE = 1 when running UVLSF this time through). The signal-to-noise ratio should improve. Continue repeating the self-cal steps until there is not a significant improvement in the SNR. Keep the SN table from the last significant improvement (this is your self-cal SN table). NOTE: For all the pilot sources, only the first self-cal resulted in improvement.

32. Go back to the original A database and follow the procedure for spectral-line Doppler correction found in section 9.4.6 in the AIPS cookbook (tasks SETJY and CVEL). It is important that you apply the bandpass during the task CVEL. For the task SETJY, important inputs are:
    - OPTYPE   ' '
    - SYSVEL   [found in the scan summary listing]
    - APARM   129,0
    - RESTFREQ   1420.4E6, 5752
    - VELTYP   'LSR'
    - VELDEF   'OPTICAL'

33. Running CVEL should produce a new .CVEL database. Run UVLSF on the .CVEL database to subtract the continuum. Use the same inputs as earlier except set DOOUTPUT = -1 to avoid creating a basfit file.

34. Use TACOP to copy the self-cal SN table to the .UVLSF database created in the previous step. Use qh to check the header of the .UVLSF file. You should have SN 1 and no CL

table higher than CL 1. You should NOT have an SU table at this point. If the SU table still exists, than a mistake has been made in one of the previous steps.

35. Apply the self-cal SN table to the .UVLSF database using SPLIT.

- AIPS 1: SPLIT   Task to split multi-source uv data to single source

- AIPS 1: Adverbs   Values   Comments

- AIPS 1: --

- AIPS 1:   also works on single files.

- AIPS 1: INNAME   '3C225BD3-A'   Input UV file name (name)

- AIPS 1: INCLASS   'UVLSF'   Input UV file name (class)

- AIPS 1: INSEQ   1   Input UV file name (seq. #)

- AIPS 1: INDISK   2   Input UV file disk unit #

- AIPS 1: SOURCES   'J094215+134549'   Source list

- AIPS 1:   *rest ' '

- AIPS 1: QUAL   -1   Source qualifier -1=>all

- AIPS 1: CALCODE   ' '   Calibrator code '   '=>all

- AIPS 1: TIMERANG   *all 0   Time range to copy

- AIPS 1: STOKES   ' '   Stokes type to pass.

- AIPS 1: SELBAND   -1   Bandwidth to select (kHz)

- AIPS 1: SELFREQ   -1   Frequency to select (MHz)

- AIPS 1: FREQID   1   Freq. ID to select.

- AIPS 1: BIF   0   Lowest IF number 0=>all

- AIPS 1: EIF   0   Highest IF number 0=>all

- AIPS 1: BCHAN   1   Lowest channel number 0=>all

- AIPS 1: ECHAN   0   Highest channel number

- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **

- #

- AIPS 1: SUBARRAY   0   Subarray, 0=>all

- AIPS 1: DOCALIB   1   > 0 calibrate data & weights

- AIPS 1:   > 99 do NOT calibrate weights

- AIPS 1: GAINUSE   1   CL (or SN) table to apply

- AIPS 1: DOPOL   -1   If >0 correct polarization.

- AIPS 1: PDVER   0   PD table to apply (DOPOL>0)

- AIPS 1: BLVER   -1   BL table to apply.

- AIPS 1: FLAGVER   0   Flag table version

- AIPS 1: DOBAND   -1   If >0 apply bandpass cal.

- AIPS 1:   Method used depends on value

- AIPS 1:   of DOBAND (see HELP file).

- AIPS 1: BPVER   1   Bandpass table version

- AIPS 1: SMOOTH   *all 0   Smoothing function. See

- AIPS 1:   HELP SMOOTH for details.

- AIPS 1: OUTCLASS   'SCVEL'   Output UV file name (class)

- AIPS 1: OUTSEQ   0   Output UV file name (seq. #)

- AIPS 1: OUTDISK   2   Output UV file disk unit #.

- AIPS 1: DOUVCOMP   -1   1 (T) => compressed data

- AIPS 1: APARM   *all 0   Control information:

- AIPS 1:   1 = 1 => avg. freq. in IF

- AIPS 1:   multi-channel out

- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **

- #

- AIPS 1: = 2 => avg. freq. in IF

- AIPS 1: single channel out

- AIPS 1: = 3 => avg IF's also

- AIPS 1: 2 = Input avg. time (sec)

- AIPS 1: 3 > 0 => Drop subarrays

- AIPS 1: 4 > 0 => calibrate weights

- AIPS 1: 5 = 0 pass only xc data

- AIPS 1: = 1 pass xc and ac data

- AIPS 1: = 2 pass only ac data

- AIPS 1: 6 > 0 add full source name

- AIPS 1: to header

- AIPS 1: NCHAV   1   Number of chan. to average.

- AIPS 1: (used if APARM(1) = 1)

- AIPS 1: <= 0 -> ALL

- AIPS 1: CHINC   1   Channel incr. between output

- AIPS 1: channels (used if APARM(1)=1)

- AIPS 1: ICHANSEL   *all 0   Array of channel start, stop,

- AIPS 1: and increment numbers and IF

- AIPS 1: number to be used when

- AIPS 1: averaging in frequency.

- AIPS 1: (used if APARM(1) = 2, 3)

- AIPS 1: ** press RETURN for more, enter Q or next line to quit print **

- #

- AIPS 1: BADDISK   *all 0   Disks to avoid for scratch

36…. [insert steps for making data cubes here]

<mark>POSSM: DOCALIB   -1</mark>
<mark>*</mark>   <mark>DOBAND   0</mark>

Other Notes

IF TARGET SOURCE IS ONE OF THE BP CALIBRATORS

- You do not need to use B & C to find the flux, just the bandpass.

- Calibrate the target source in the A database using the appropriate model.

IF PHASE CALIBRATOR AND TARGET SOURCE ARE THE SAME

- OPTION 1: When using CLCAL, source and calsour will be the same object name, but CALCODE will not be '' (use the appropriate calcode from the scan summary listing for the scans designated as "phase calibrator scans").

- OPTION 2: If you wish to use all scans, you will need to remove the calcodes so that AIPS treats the file as a single-source file (see instructions below, this is what I did when the target source was also the phase calibrator). I believe you then use CLCAL with source and calsour being the same object name and CALCODE set to null '', but I can't find in my notes if this is what I did for sure.

REMOVING CALCODES WHEN PHASE CALIBRATOR AND TARGET SOURCE ARE SAME

- Use the task DSORC to re-label calcoded sources to non-calcoded sources. INNAME and OUTNAME should be the same (want to overwrite the existing file). Get the source numbers from the scan summary listing.

- o   AIPS 1: DSORC   Renumbers selected source numbers

- o   AIPS 1: Adverbs   Values   Comments

- o   AIPS 1: --

- o   AIPS 1: <mark>INNAME</mark>   '4C12-50-A'   Input UV file name (name)

o   AIPS 1: INCLASS   'UVEVLA'   Input UV file name (class)

o   AIPS 1: INSEQ   1   Input UV file name (seq. #)

o   AIPS 1: INDISK   2   Input UV file disk unit #

o   AIPS 1: OUTNAME   '4C12-50-A'   Output UV file name (name)

o   AIPS 1: OUTCLASS   'UVEVLA'   Output UV file name (class)

o   AIPS 1: OUTSEQ   1   Output UV file name (seq. #)

o   AIPS 1: OUTDISK   2   Output UV file disk unit #.

o   AIPS 1: APARM   1   *rest 0   Source numbers to be changed

o   AIPS 1: BPARM   3   *rest 0   into these numbers

•   Use TBOUT to write the SU table to a text file (must actually delete the listing for the coded source number, flagging it won't work)

o   AIPS 1: TBOUT: Task to Write AIPS tables to text files.

o   AIPS 1: Adverbs   Values   Comments

o   AIPS 1: --

o   AIPS 1: INNAME   '4C12-50-A'   Image name (name)

o   AIPS 1: INCLASS   'UVEVLA'   Image name (class)

o   AIPS 1: INSEQ   1   Image name (seq. #)

o   AIPS 1: INDISK   2   Disk drive #

o   AIPS 1: INEXT   'SU'   Extension type

o   AIPS 1: INVERS   0   Extension file version #

o   AIPS 1: OUTTEXT   '/users/dable/suout.txt'External text file name.

o   AIPS 1: DOCRT   132   Max width of output (char)

o   AIPS 1: BCOUNT   1   Begin Table record to Write

o   AIPS 1: ECOUNT   0   End Table record to Write

•   Use a text editor to open the suout.txt file you created. Delete row entries that refer to the source number with the calcode. Also, near the top of the text file is a variable that tells the number of rows in the file…this should be changed to one since there should only be one row now.

•   Use TBIN to read the SU table back into the A database (must delete the old SU table first…TBIN will not overwrite).

o   AIPS 1: TBIN : Task to Read AIPS tables from text files.

o   AIPS 1: Adverbs   Values   Comments

o   AIPS 1: --

o   AIPS 1: OUTNAME   '4C12-50-A'   Image name (name)

o   AIPS 1: OUTCLASS   'UVEVLA'   Image name (class)

o   AIPS 1: OUTSEQ   1   Image name (seq. #)

o   AIPS 1: OUTDISK   2   Disk drive #

o   AIPS 1: INTEXT   '/users/dable/suout.txt'External text file name.

o   AIPS 1: BCOUNT   1   Begin Table record to Read

o   AIPS 1: ECOUNT   0   End Table record to Read

•   You should now have a single-source file. NOTE: I have not tried this, but I believe, once you run DSORC, you should be able to just delete the SU table and not mess with editing it since you shouldn't need an SU table for a single-source file. I no longer have AIPS access to test this, but it might be worth a try.