

## Notes from Hands-on Session: AIPS – Day 1 (29 June) From Cornelia Lang

**These notes can be generalized, but here are tailored to the data associated with observation AT166 from 1994. There are two array configurations: B and C taken several months apart. Polarization notes to follow in separate file.**

### **A few notes about AIPS:**

aips tv=local:0 – best way to start aips for graphics consistency

ucat: lists (u,v) data

mcat: lists images

pcat: lists both

task 'taskname': sets up the task

inp: lists the inputs

default taskname: sets the task with default parameters

getn : will get a file by its catalog number

kl: for “kleenex” – best way to log out – kills graphics

### **1. FILLM: reads raw VLA data into aips**

default fillm or task 'fillm'

inp

datain 'FITS:AT166\_'

band 'C' → sets the frequency; C band = 5 GHz = 6 cm

nfiles 1 → skips one file ahead

ncount 2 → will read in two additional files

inp → check your inputs!

go

### **2. UVFIX: preprocesses the data between B1950 and J2000**

task 'uvfix' or default uvfix

getn CBAND UVDATA

inp → should be mostly defaults set

go

This task will produce a new (u,v) database with the suffix “UVFIX”. This is the multisource file you want to use from now on.

### **3. LISTR: lists the (u,v) data in a variety of ways**

```
default listr or task 'listr'  
getn CBAND UVFIX data  
inp  
optype 'scan'  
doctr 1 → prints the listing to your screen  
go
```

here, you can identify your:

```
flux calibrator: '0134+329' or 3C48  
phase calibrator: '0420+417'  
target source: '3C129'
```

### **4. PRTAN: prints the antenna locations and numbers; need for finding refant**

```
task prtan  
getn CBAND UVFIX data  
doctr 1  
go
```

### **5. TVFLG: quick look at your data; can look at all together or source-by-source**

```
default tvflg or task 'tvflg'  
getn CBAND UVFIX data
```

if looking at individual sources, then type  
source '0134+329' or '0420+417' – no need to flag target data yet!  
otherwise source " to look at all sources

```
docat -1 → so that this task does NOT write a log file (.TVFLG)  
inp  
go
```

tvflg is interactive flagging. Look through your data by switching between stokes LL and RR and also IF 1 and 2.

Some parameters to set before flagging:

```
set stokes flag : 1111 in the aips window  
set all-IF  
set one-source
```

## 6. SETJY: assign a flux density to your flux calibrator source

```
default setjy
getn CBAND UVFIX uvdata
inp
source '0134+329'
optype 'calc'
freqid 1
go
```

Should give you a message listing the flux for each IF; they are different because the calibrator's flux is changing with frequency

## 7. CALDIR: list the flux calibrator models

```
task 'caldir'
go
```

## 8. CALRD: load the flux calibrator model (image) into your aips catalog

```
task 'caldr'
object '3C48'
band 'C'
go
```

should read a file called 3C48\_C .MODEL . 1 (MA) into the aips catalog

## 9. CALIB: determine amplitude and phase solutions for the calibrators; you will run this twice: (a) for '0134+329' and (b) for '0420+417'

(a)

```
default calib or task 'calib'
inp
getn CBAND UVFIX uvdata
source '0134+329'
get2n # (where # is catalog number of model image; mcat for listing of images)
refant 22
cmodel 'comp'
snver 1
inp
go
```

(should get ~100 good solutions); now just change source and get rid of model image

(2)

```
tget calib
inp
source '0420+417'
clr2na → clears the input for 2n
smodel 1 0
snver 1 → will write solutions into same SN table
go
(should get ~900 good solutions)
```

CALIB will produce a table of solutions called an SN table. This is attached the UVFIX data.

### **10. SNPLT: inspect solutions from CALIB**

```
default SNPLT or task 'snplt'
inp
getn CBAND UVFIX uvdata
nplots 9
optype 'AMP' first and then 'PHAS'
snver 1
dotv 1
go
```

look for consistency in amplitude and smooth changes in phase  
refant will have phase = 0

### **11. GETJY: determine flux density of phase calibrator from solutions in CALIB**

```
default getjy
getn CBAND UVFIX data
source '0420+417' "
cals '0134+329' "
bif 1
eif 2
snver 1
freqid 1
```

Make sure to check messages here! It should give you a flux for each IF for 0420+417 (in this case, ~1.4 Jy).

**11. CLCAL: calibrate calibrator data; apply/interpolate solutions across calibrator for target source. Will run twice: (a) for calibrators and (b) for target source**

```
(a)
default clcal or task 'clcal'
inp
getn CBAND UVFIX uvdata
source '0134+329' '0420+417' "
cals source
interpol 'SELF'
gainver 1
gainuse 2
snver 1
go
```

```
(b)
tget clcal
inp source '3C129', "
cals '0420+417' "
interpol '2PT'
gainver 1
gainuse 2
snver 1
go
```

**12. UVPLT: to plot (u,v) distance versus amplitude - check quality of calibration and data (may need to do editing afterwards if plot doesn't look good)**

```
default uvplt
getn CBAND UVFIX uvdata
source '3C129' or '0420+417' → to look at source or calibrator
docal 1 → to apply the calibration!
dotv 1
go
```

**13. SPLIT**

```
default split
getn CBAND UVFIX data
source '3C129'
docal 1
dotv 1
go
```

will produce 3C129.SPLIT file to be used for imaging!