

ParselTongue

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Software infrastructure for the ALBUS project (a RadioNet JRA)

- to develop and implement new calibration algorithms
- to implement pipelines that produce new/better data products

Binding classic AIPS (and possibly other packages) to Python.

Useful for any science project that uses AIPS for data processing: EVN, VLBA, MERLIN, VLA, GMRT, WSRT ...

Uses parts of the Obit package written by Bill Cotton, NRAO.

<http://www.radionet-eu.org/rnwiki/ParselTongue>

- Running AIPS and Obit tasks
- Access to the AIPS catalog
- Access to AIPS images and UV data
- Access to AIPS extension tables
- Logging
- Access to the AIPS TV
- XML-RPC interface
- Access to FITS files?

Do things the Python way as much as possible:

- use Python iterators:

```
for row in table:  
    print row
```

- Python-style array indexing

Keep things people like in AIPS/POPS:

- Minimal match
- Array indices that match AIPS documentation

Written by Cormac Reynolds; evolution of POPS script from Phil Diamond. Used by support scientists at JIVE to check data quality

- Handles EVN and VLBA data; should be easily adaptable for other instruments.
- Pipeline products:
 - Lots of diagnostic plots
 - Calibration tables
 - Dirty maps
 - Crude maps (a few rounds of selfcal)
- Checkpointing: Pipeline can be restarted at various point.
- Automatic defaults based on metadata.
- Reusable building blocks.

<http://www.radionet-eu.org/rnwiki/ParselTongueScripts>

1. Load and sort the data
2. A priori data flagging
3. Plot the raw data
4. Amplitude calibration and parallactic angle correction
5. Fringe fitting
6. Bandpass calibration
7. Plot the results after ampcal, fringe fitting and bandpass
8. Split
9. Create multi files and make dirty maps and first clean maps
10. Continue mapping
11. Plot the final data
12. Calculate the antenna sensitivities
13. Save useful data and plot final map

The pipeline is driven by a simple input file:

```
# tmask is a range of steps to be carried out. tmask=1 will run the whole
# pipeline.
tmask = 1

# if a multiple pass experiment then append the pass number to the experiment
# name (e.g. n05c3_1)
experiment = n05c3
userno = 3602

# refant is a prioritised list of reference antennas
refant = Ef, Mc, Nt

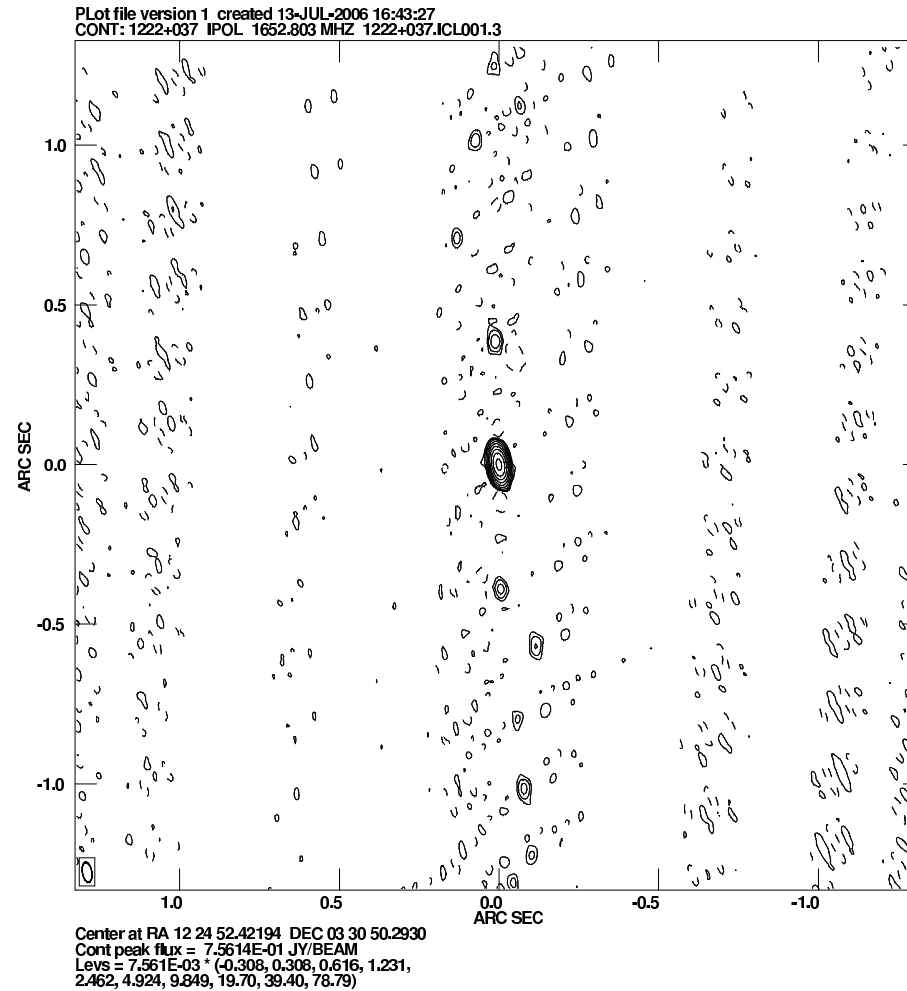
# plotref is a list of antennas, baselines to which will be plotted.
plotref = Wb

# bpass is a list of sources for bandpass calibration
bpass = 3C345, 3C454.3

# phaseref and target must be set if phase referencing. Each source in target
# list will be phase calibrated by the corresponding source in phaseref list.
phaseref = 3C454.3
target = J2254+1341

# solint defaults to typical scan length on phase calibrator. Must be set if
# not phase referencing.
#solint = 0
```

Final image of 1222+037 from the EVN Pipeline:





EVN Archive



Contains the pipeline products for all experiments correlated at JIVE.

Some products only available to PI until data becomes public.

<http://www.jive.nl>

- Field of view limited by time smearing.
- EVN correlator can dump data at higher rates (PCInt)
- Allows wide-field VLBI.

Problem: very big data sets (100s of GB).

Solution: User-steerable pipeline that produces averaged down data set with different field center.