- VLBA 3mm Status

GMVA TOG May 2020 - Blanchard

GMVA run 2019 Problems

- Inconsistent Fringes.

- Generally low number of fringes.

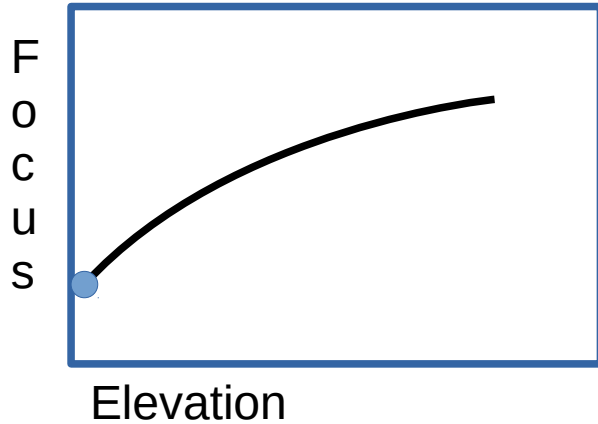- Fringe amplitude dropping during scan.

Red is bad…

- Root cause – new ACU

- VME replacement.

- Impossible to maintain.

- New system controlled by Executor – same software as VLA.
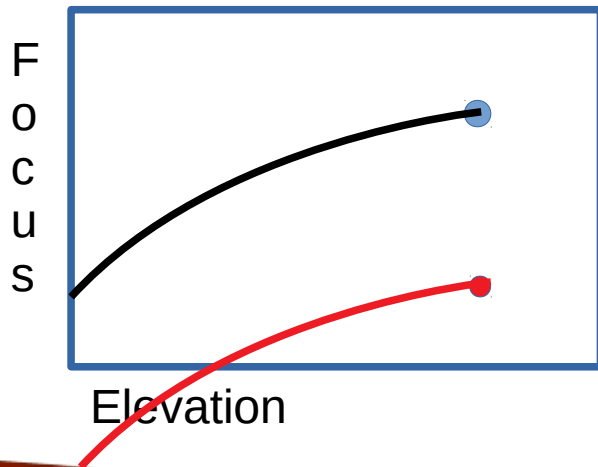
- Not all tools complete.

Station VME computer

Major bug 1: Focus

- Focus is corrected for band and elevation.

- VME system zero position is 'bottom up':

- NOVME (VLA) system zero position is 'top down'

Major bug 1: Focus

- Additionally unit change from mm to cm meant corrections with respect to elevation were 10 times too small.

  - Smaller effect than incorrect starting position.

- Correct focus could not be determined with the new system until new code was completed ~ 1 month ago.

  - Updates are ongoing.

Major bug 2: Reference pointing.

- Pointing pattern is a Craig's Cross:
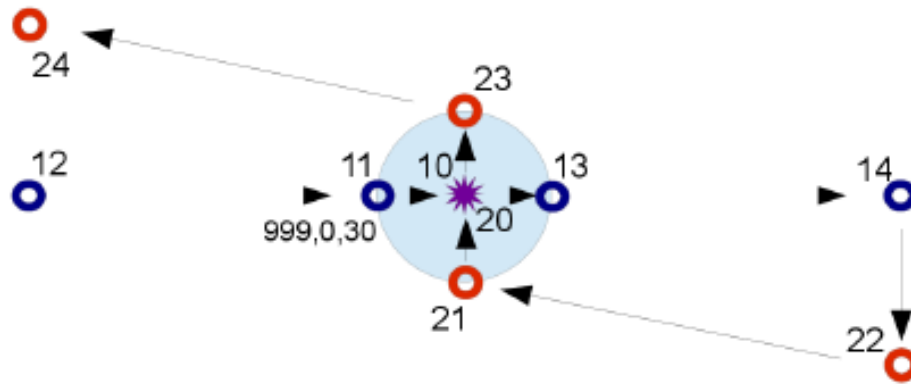
- Position offset of last position in the cross applied to next scan.
 - 80% chance of being off source after a reference scan.

Minor bugs/improvements:

- EW-tilt sign flip in pointing equation.

- Dynamic pointing pattern length – waits for good data.

- Better flagging of data in between pointing positions.

- Pointing equation updates – large corrections were needed.

- Collimation offsets updated – ongoing struggle at 3mm.

- Line pointing correctly subtracts background (setup issue).

- Some ability to 'search' for a source if not in beam.

- 1s power glitches due to bad synthesizer.

Test before GMVA run on 3C84.

Station	% Scans with Fringe
BR	68
FD	92
KP	83
LA	96
MK	0
NL	80
OV	75
PT	87

GMVA Run 2020 C201A

- Pointing attempts:
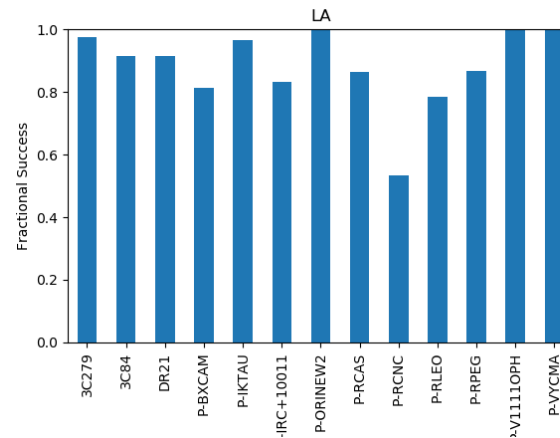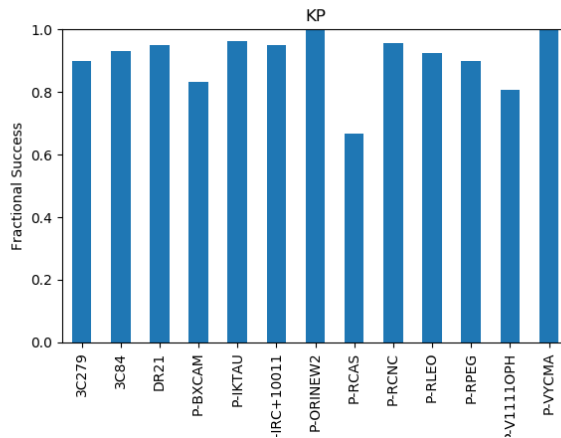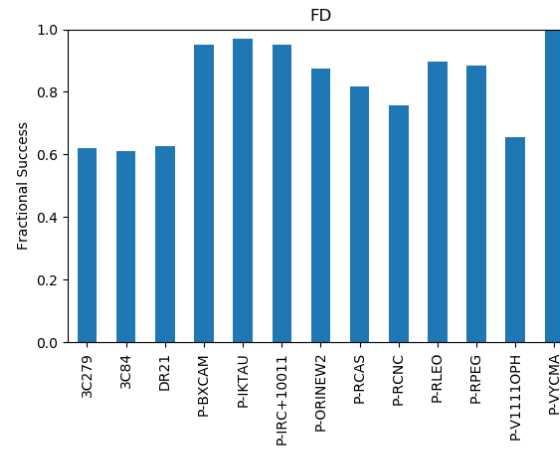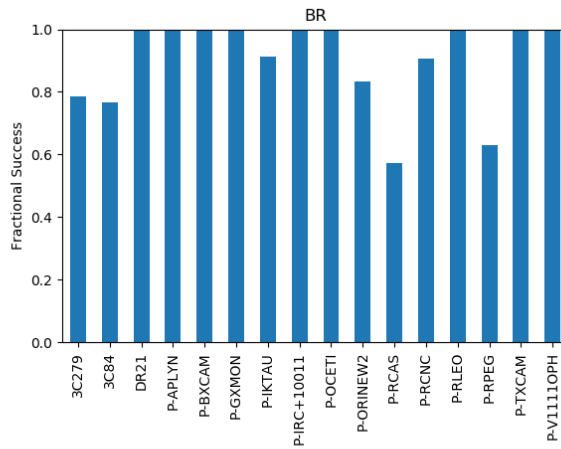
Ongoing issues/improvements

- Reference pointing currently only uses the first successful pointing attempt to determine offsets to apply.

    - Would be nice to use some kind of average.

    - Multiple pointing scans gain you nothing.

- Reference pointing solution could use tighter limits for accepting a solution.

- Focus still needs checking for most stations at 3mm.

- Further pointing equation updates needed including collimation offsets.

- Rotation of the subreflector can currently not be calibrated.

Ongoing issues/improvements

- Sharp discontinuity in pointing equation.

    - Potentially rail heights? Not understood.

- Interferometric pointing.

    - Can use weaker sources.

    - Less affected by interference.

    - More stable solutions.

    - First tests promising (offline only).

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