BBS - New Images, Overview and Progress Plan

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CS1 meeting

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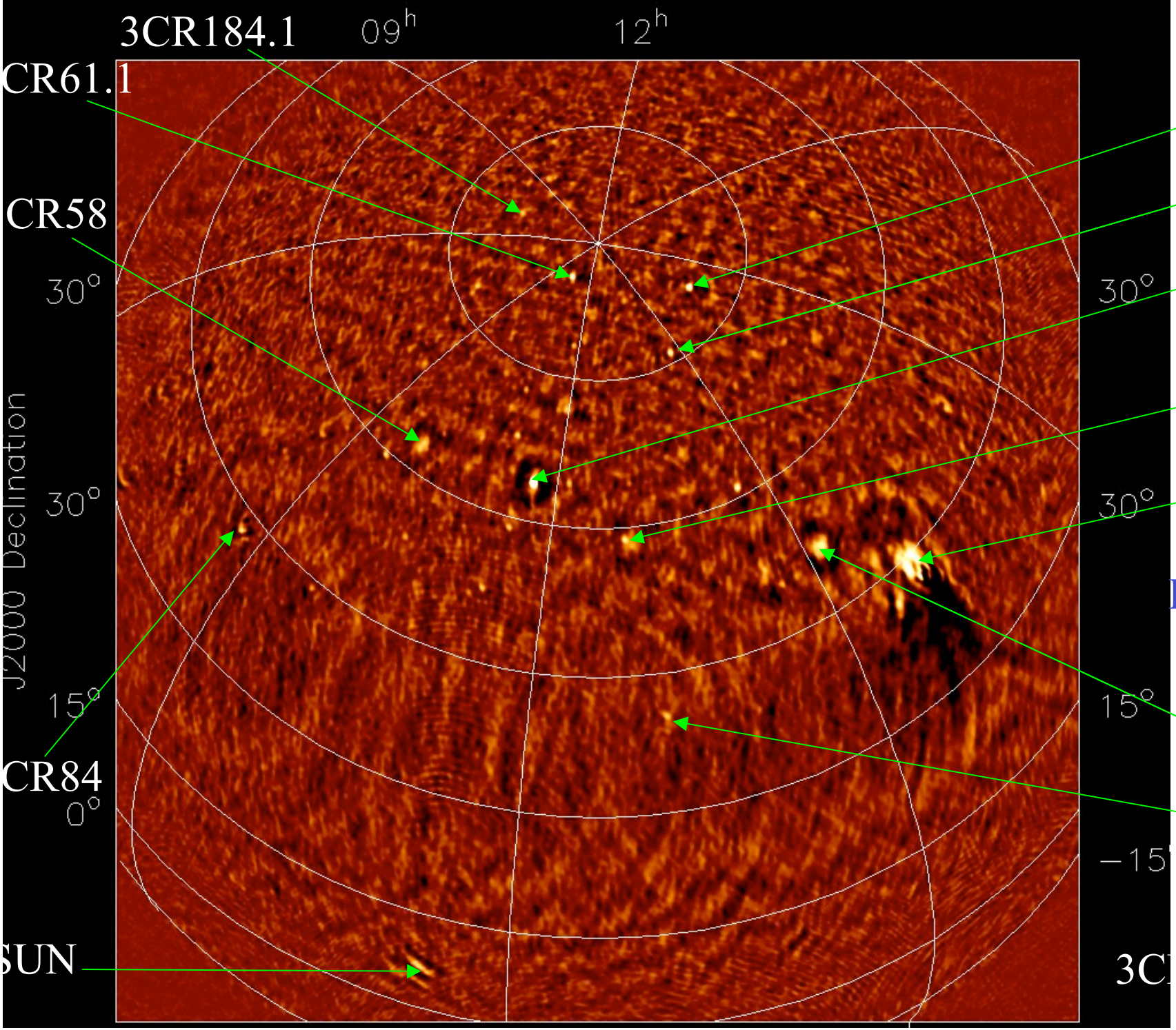
Outline - Recap

1. Recap - BBS - First Image (>40sources) (Mar 30 obsvn) - Sep, 07
2. Analysis - Processing Pipeline, Solutions, Limitations
3. **Lessons Learnt**
4. **Processing of Recent LBA observations - New deeper Images**
5. **Processing of HBA observations - Initial Images**
6. Conclusions - BBS Status, different versions, Next Course of action

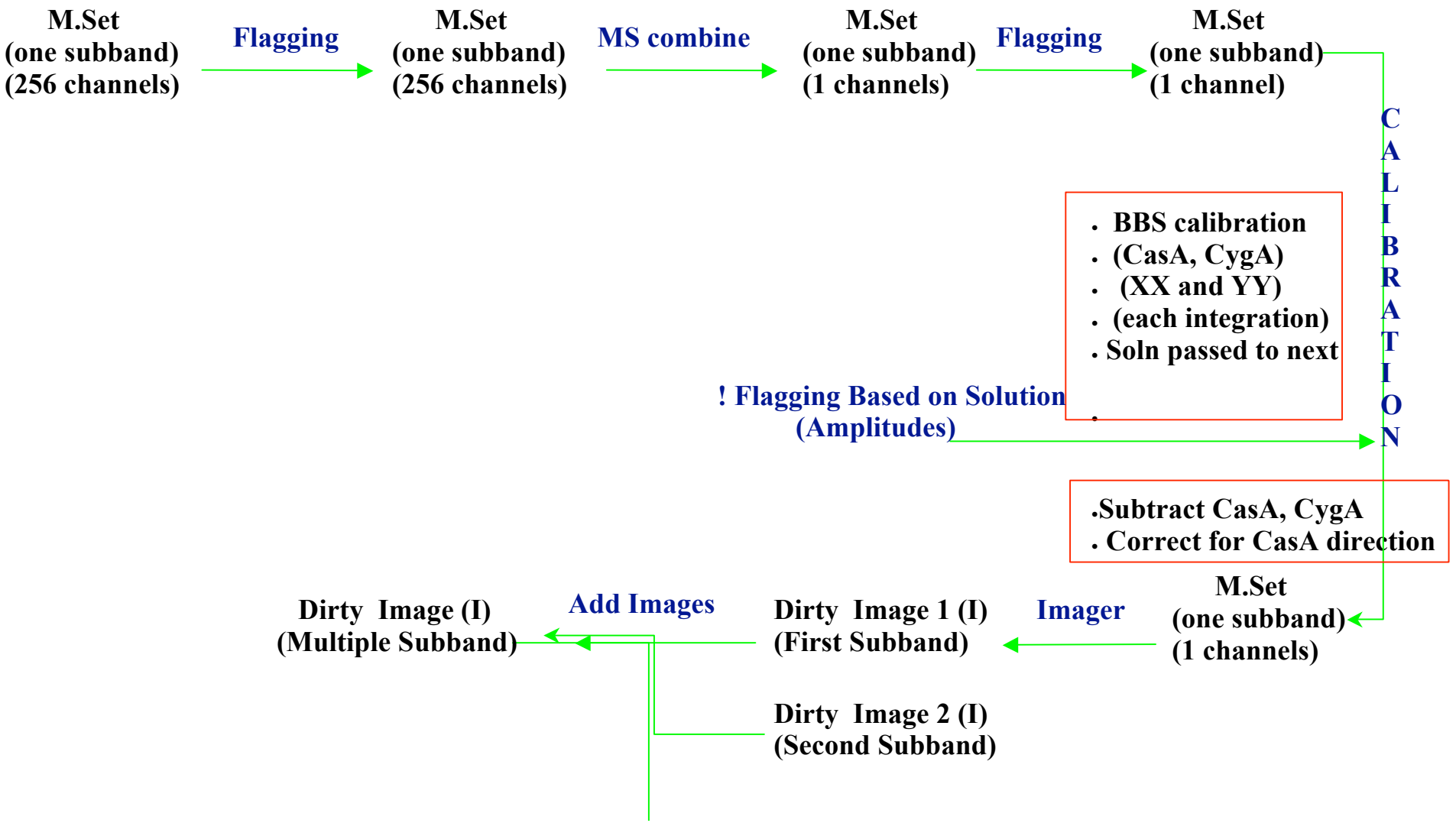


BBS Image

LBA47-62MHz

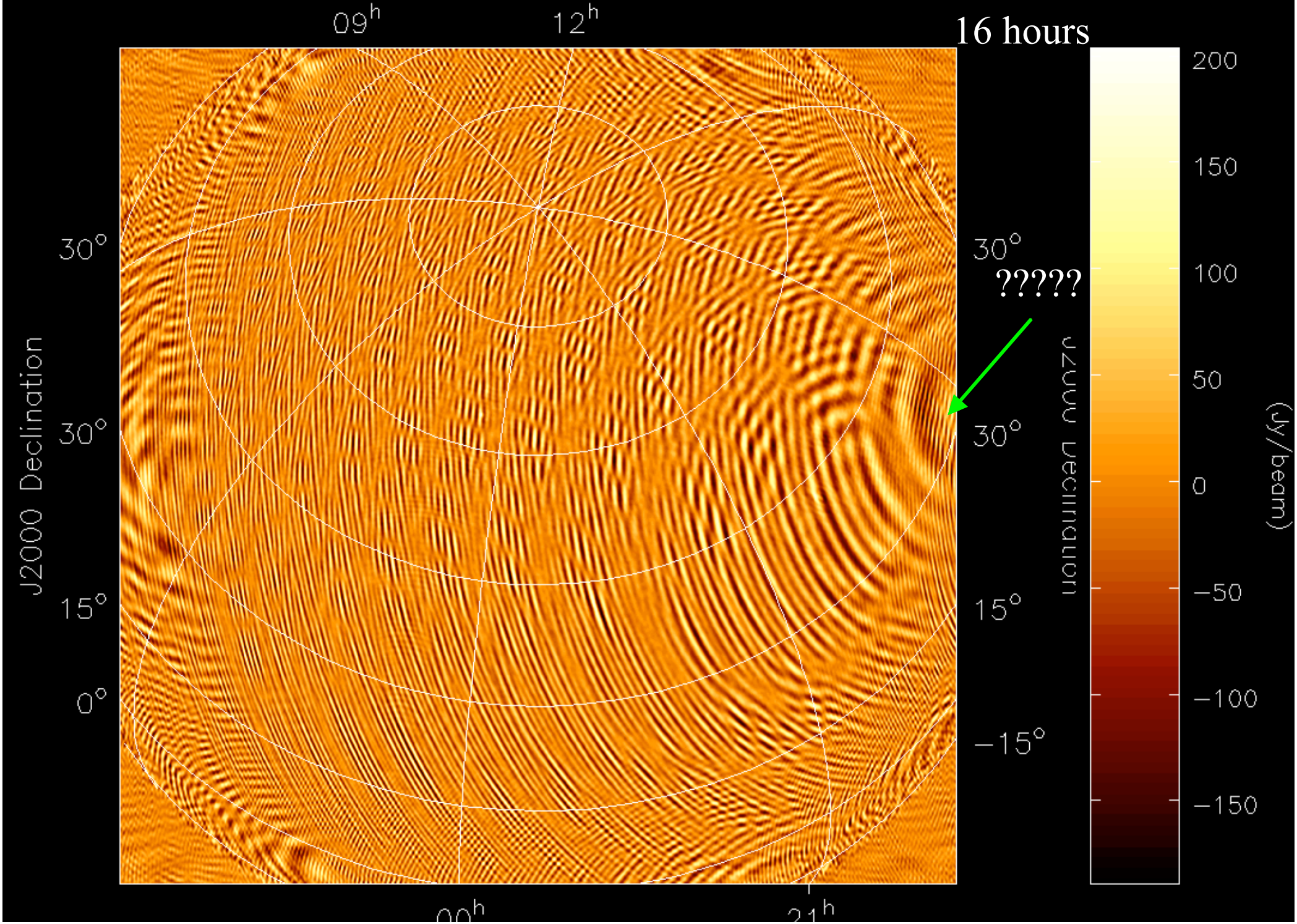
- March 30, 07
- MS1810
- 6 Subbands
- No MMSE

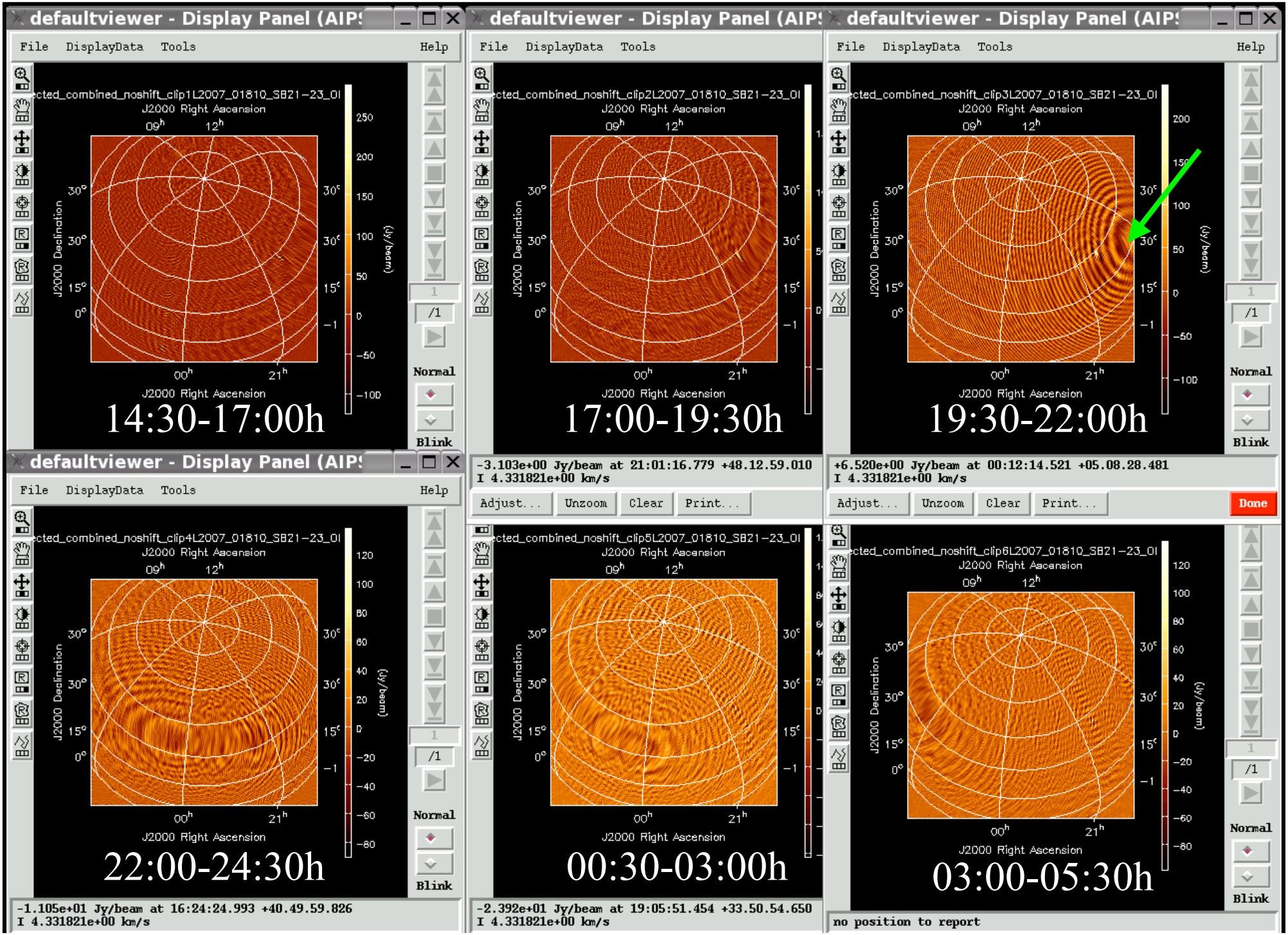
Analysis: Steps-Schematic

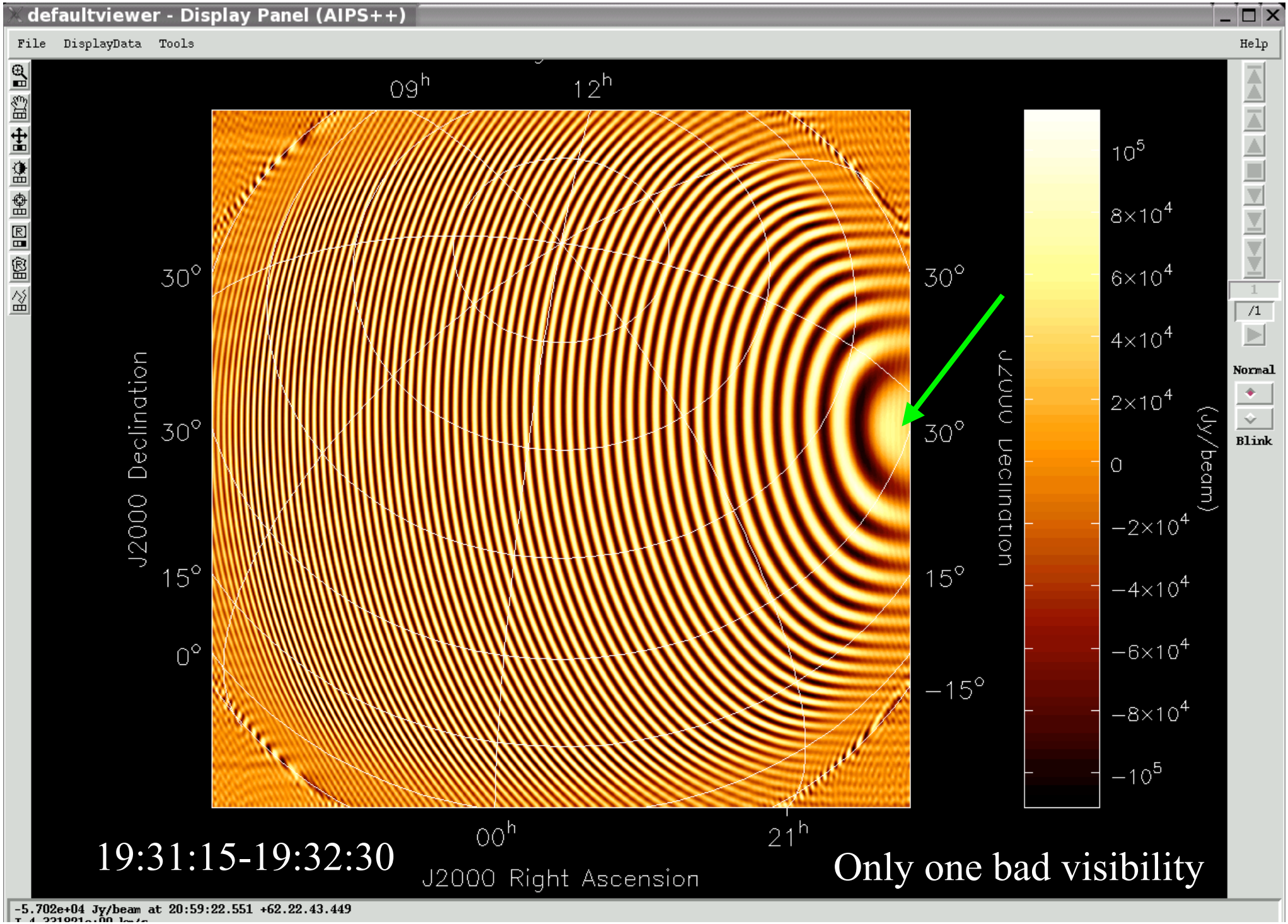


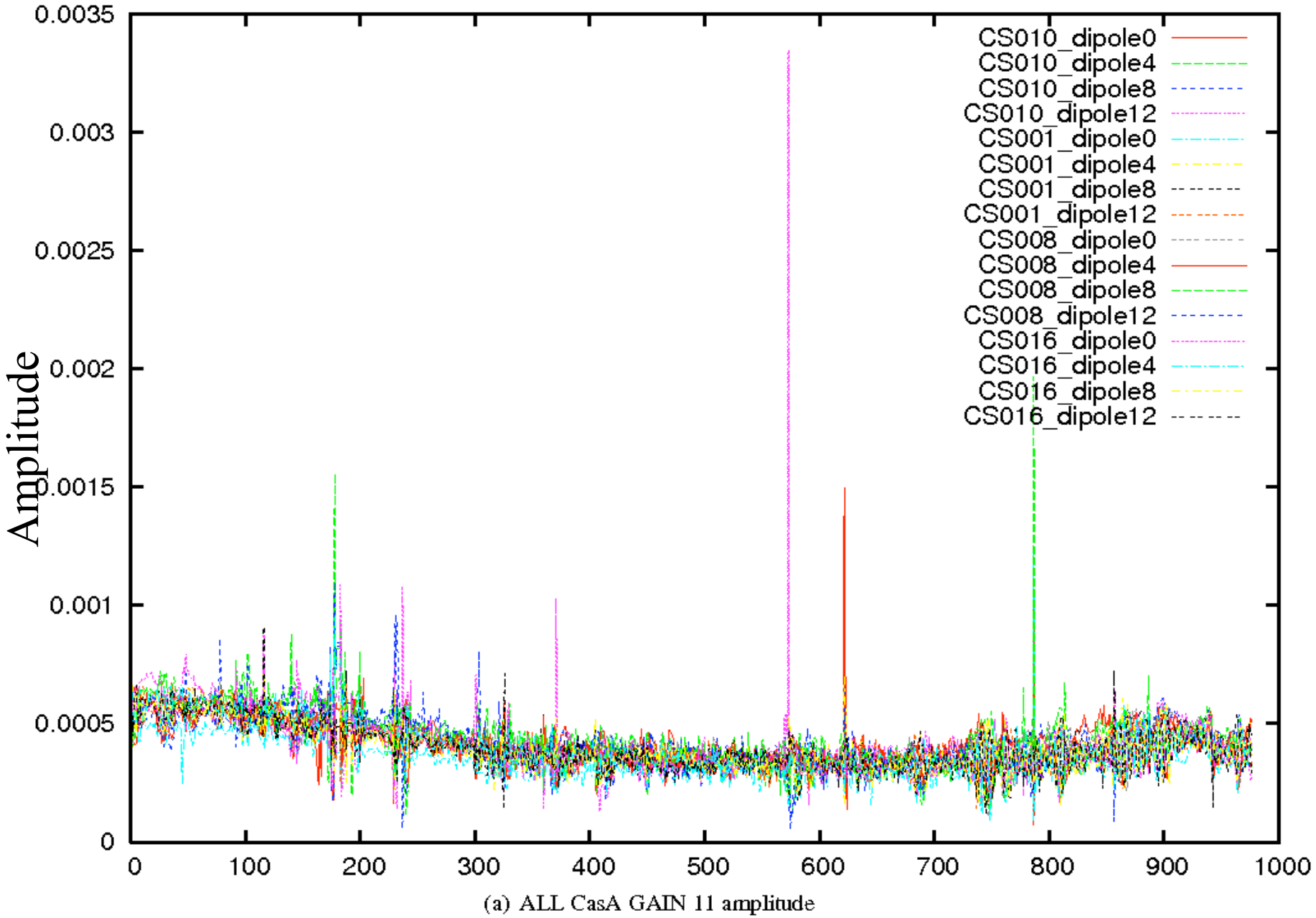
Limitations - Bottlenecks

- Out of 15 Sub bands processed (37 to 72MHz) ->Images for 10 Sub bands seem to be good !!
- Rigorous pre-calib flagging -> 13 Good images.
- Post-calib flagging -> 13 good images.
- Is it necessary to do Post-Calibration Flagging?
- Let us look at one sub band where we failed!!

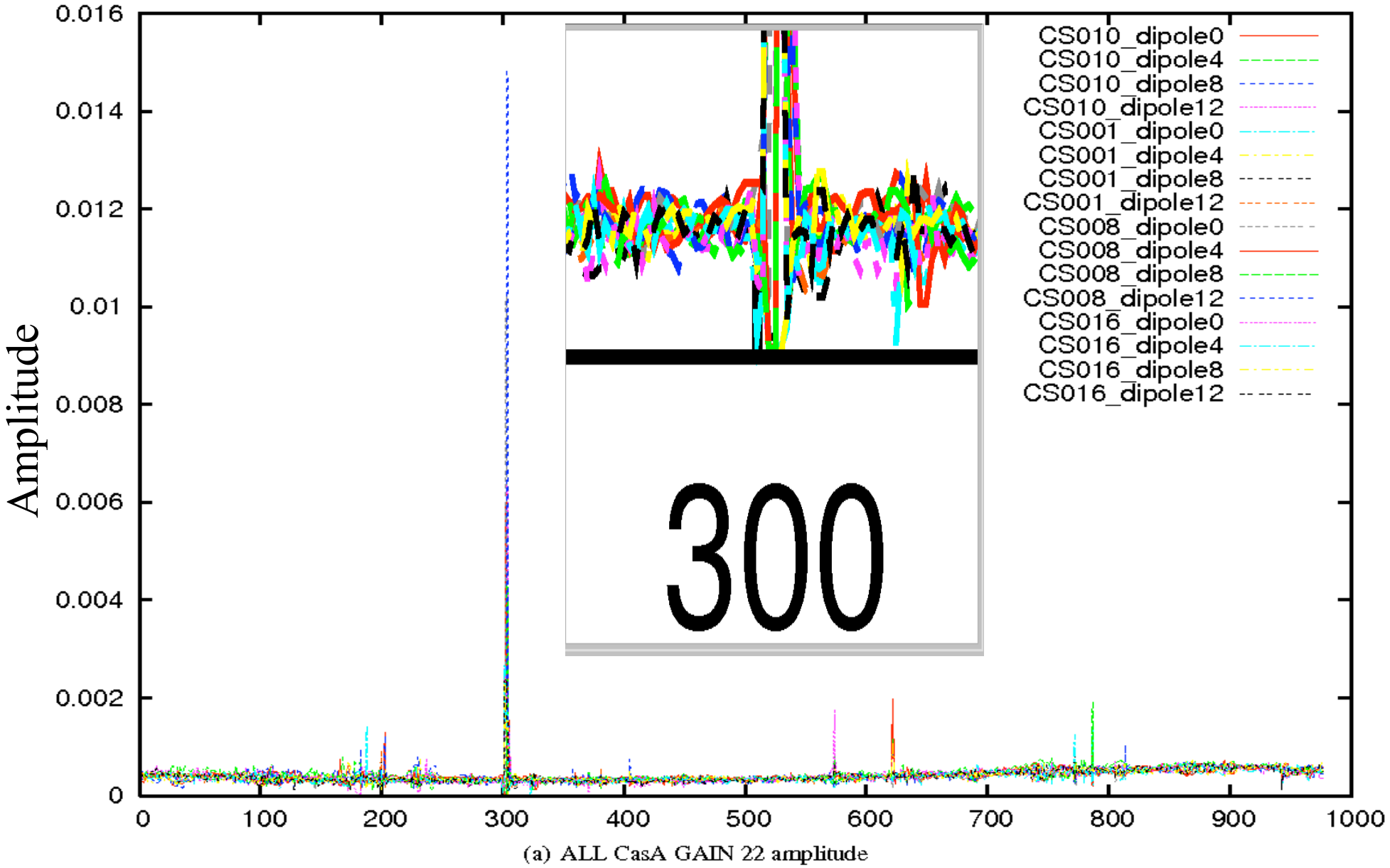

16 hours
09h
12h
00h
21h
30°
30°
15°
0°
30°
30°
15°
−15°
?????
J2000 Declination
J2000 Declination
200
150
100
50
0
−50
−100
−150
(Jy/beam)


defaultviewer - Display Panel (AIPS
File DisplayData Tools Help
J2000 Right Ascension
J2000 Declination
(Jy/beam)
Normal
Blink
14:30-17:00h
17:00-19:30h
19:30-22:00h
22:00-24:30h
00:30-03:00h
03:00-05:30h
-3.103e+00 Jy/beam at 21:01:16.779 +48.12.59.010
I 4.331821e+00 km/s
+6.520e+00 Jy/beam at 00:12:14.521 +05.08.28.481
I 4.331821e+00 km/s
Adjust... Unzoom Clear Print...
Done
-1.105e+01 Jy/beam at 16:24:24.993 +40.49.59.826
I 4.331821e+00 km/s
-2.392e+01 Jy/beam at 19:05:51.454 +33.50.54.650
I 4.331821e+00 km/s
no position to report


defaultviewer - Display Panel (AIPS++)
File
DisplayData
Tools
Help
09h
12h
30°
30°
15°
0°
J2000 Declination
30°
15°
−15°
J2000 Declination
10^5
8×10^4
6×10^4
4×10^4
2×10^4
0
−2×10^4
−4×10^4
−6×10^4
−8×10^4
−10^5
(Jy/beam)
Normal
Blink
00h
21h
J2000 Right Ascension
19:31:15-19:32:30
Only one bad visibility
-5.702e+04 Jy/beam at 20:59:22.551 +62.22.43.449

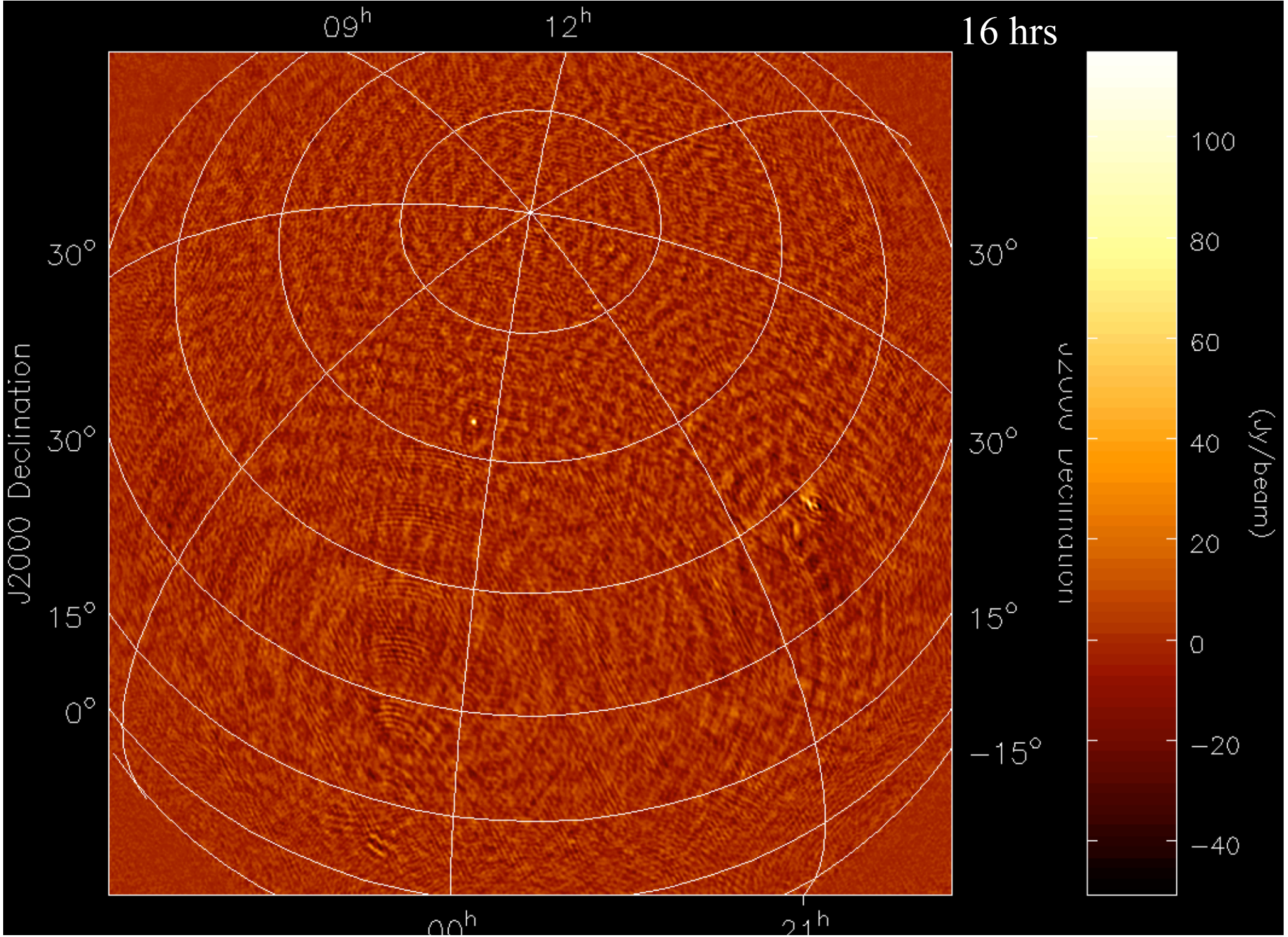


CasA 11, Amplitude



(a) ALL CasA GAIN 22 amplitude

Time (Integration number~minute) CasA, (YY) Amplitude


16 hrs
09h
12h
00h
21h
30°
30°
15°
0°
30°
30°
15°
−15°
J2000 Declination
J2000 Declination
100
80
60
40
20
0
−20
−40
(Jy/beam)

Lessons Learnt / Open Issues

- Bad solutions -> may introduce distortions -> a unphysical image!
- Extra intelligence/flagging needed during the solving process! -> careful while passing the solutions to next time slot!
- chi^2 based ideas, error bar on each solved parameter, condition number
- % of data flagged in a solve domain
- pre-post calibration (including based on solutions, residuals, corrected data) flagging
- MMSE !!
- More Ideas!!?

Processing recent LBA Observations

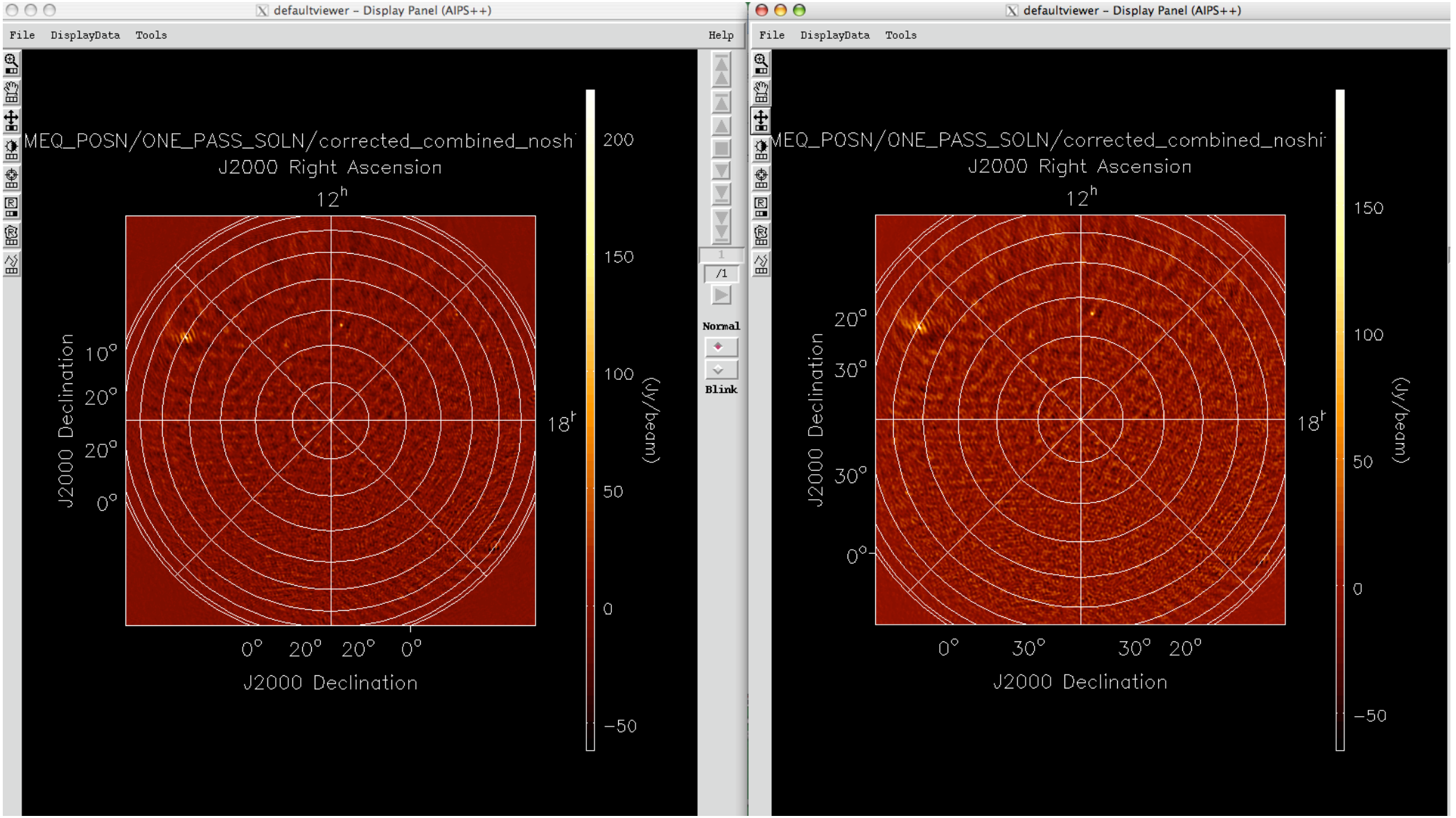
- L3463 (July 27, 07), L3464 (July 28, 07), L3565 (Aug3, 07) , …
- 36 subbands, from 38-62MHz. Phased at NCP.
- Same scheme of processing.
- Initial flagging -> solving complex gains for CasA and CygnusA
- Subtract CasA and CygnusA
- Correct for the direction of CasA
- Image using AIPS++ imager
- Individual Subband images, and then combined image

MS3463; Sub Band: 18

Small improvement

After Solution Flags

Before Solution Flags

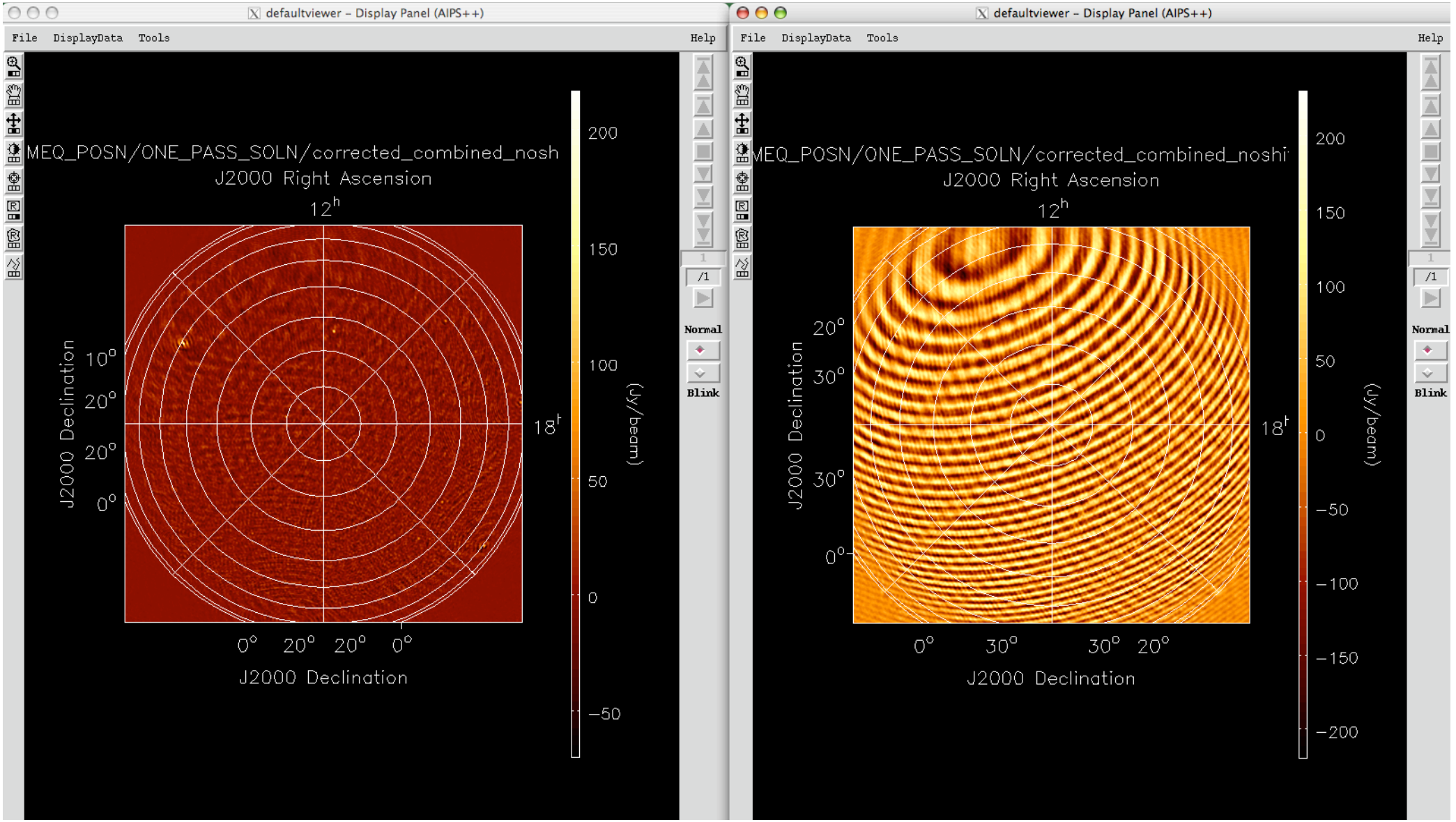


MS3463; Sub Band: 19

Improvement !!!

After Solution Flags

Before Solution Flags



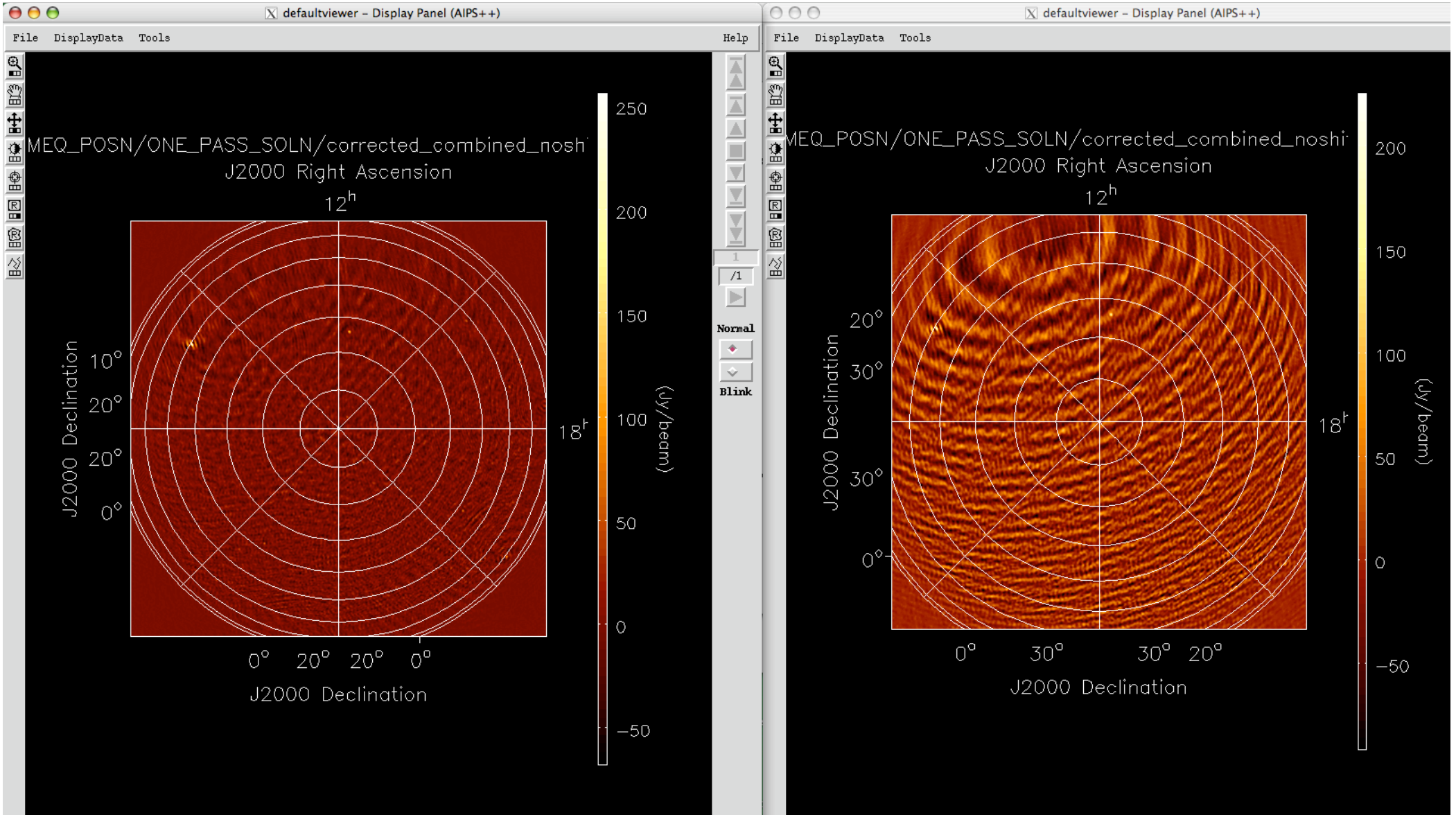
Improvement

25 before 36 after

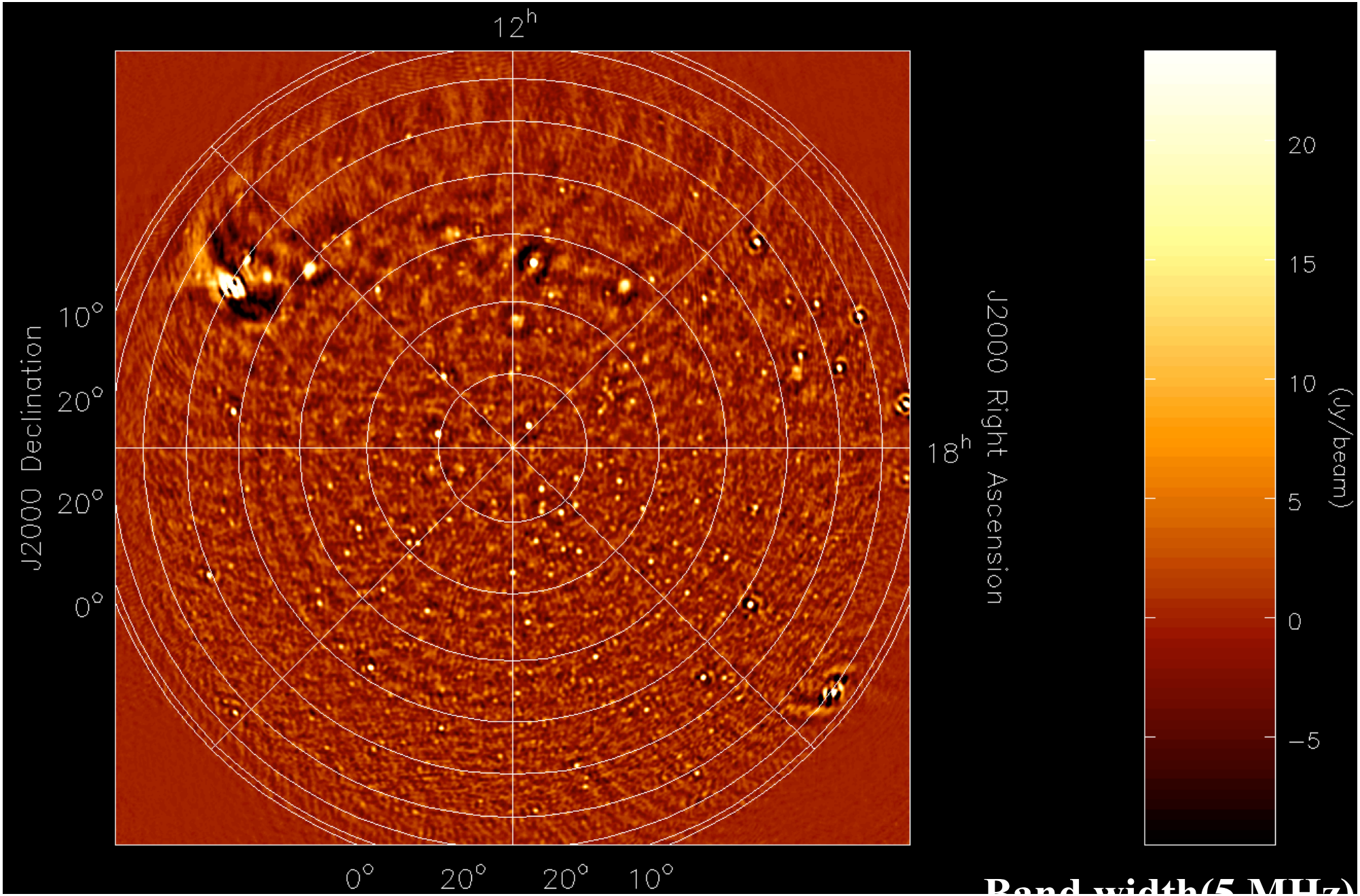
MS3463; Sub Band: 21

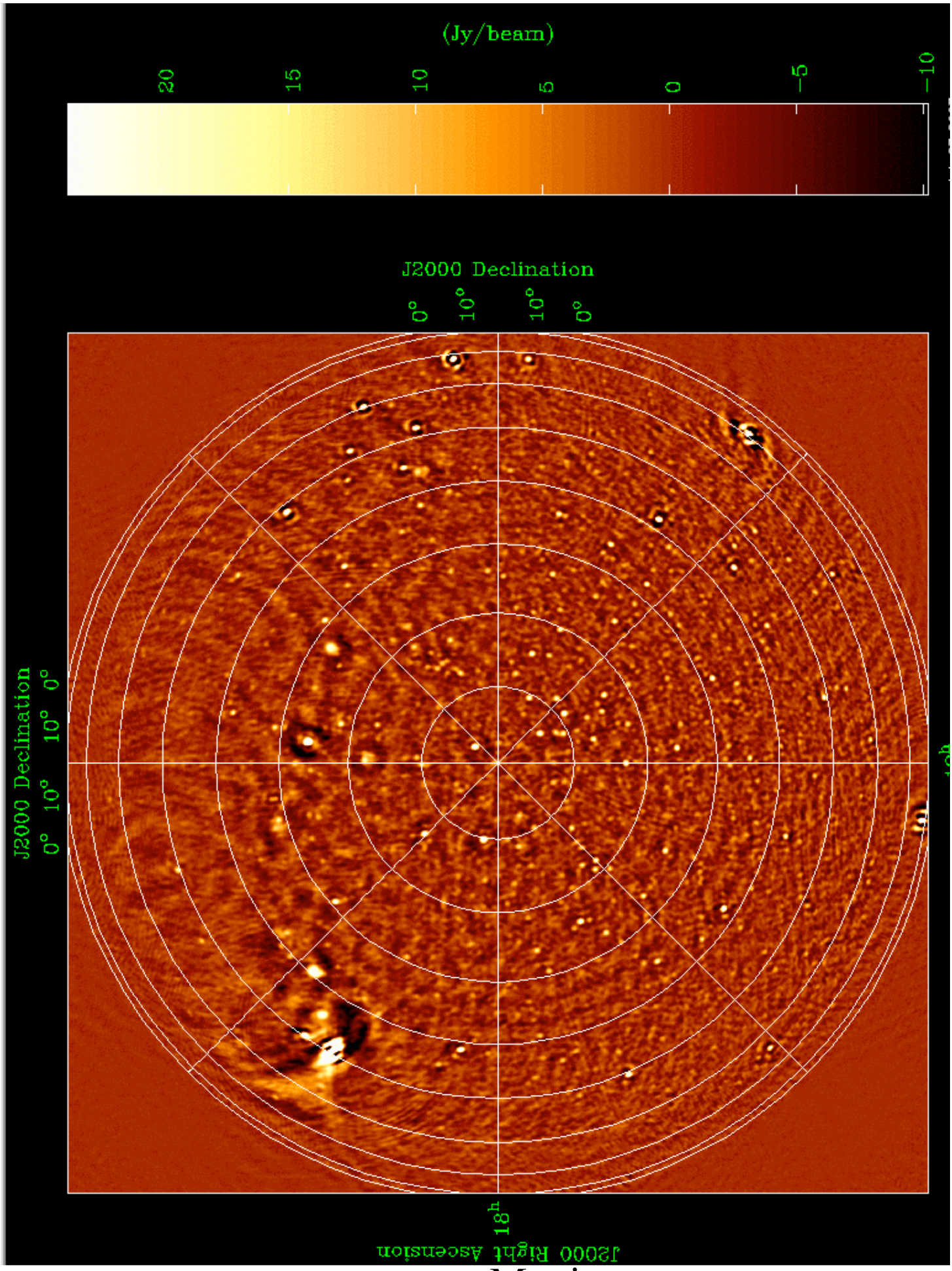
After Solution Flags

Before Solution Flags



MS3463; Average {Sub Band: 0-35} 99.8%. **>400 sources**



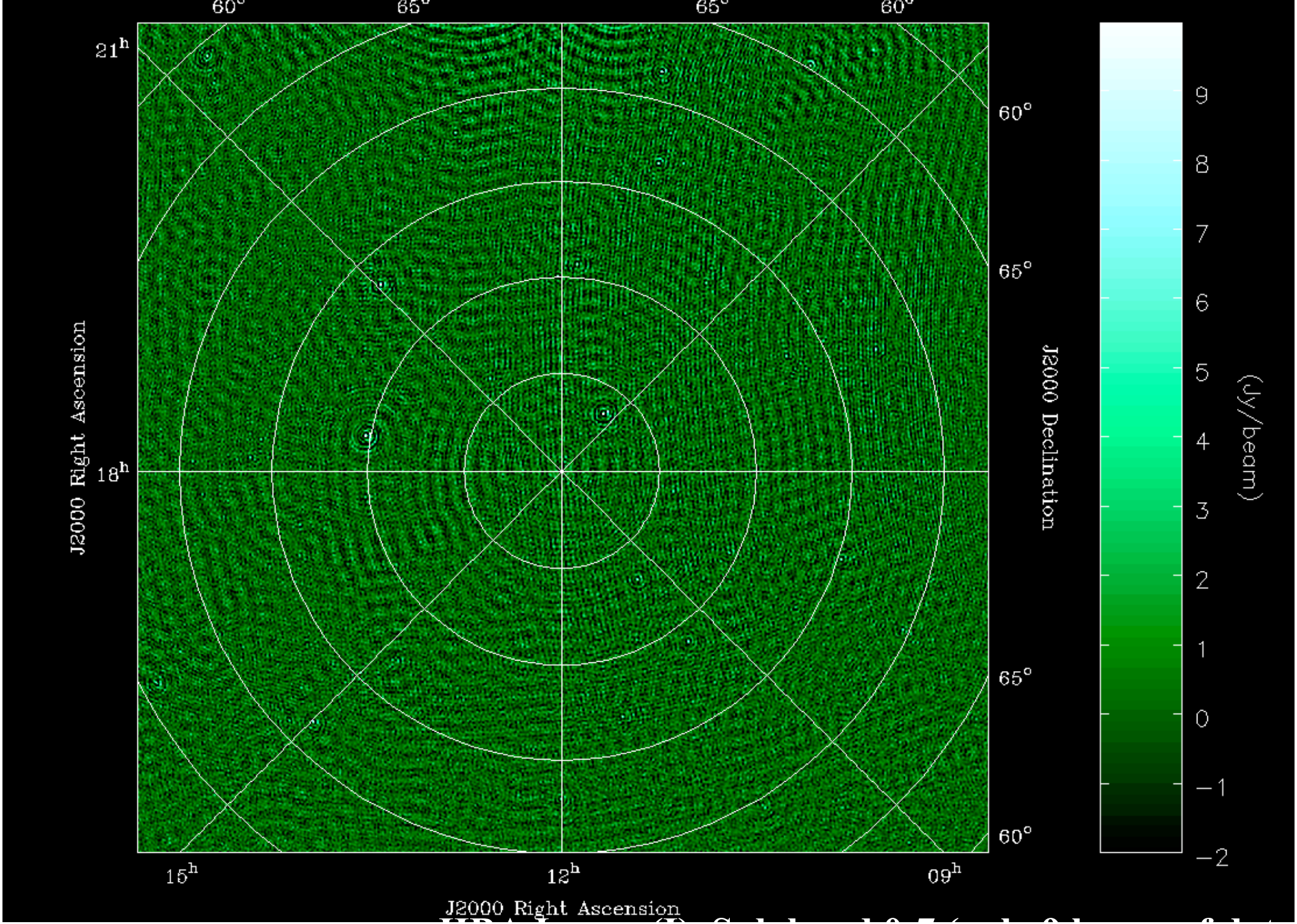

(Jy/beam)
20
15
10
5
0
−5
−10
J2000 Declination
0°
10°
10°
0°
J2000 Declination
0° 10° 10° 0°
J2000 Right Ascension
18h

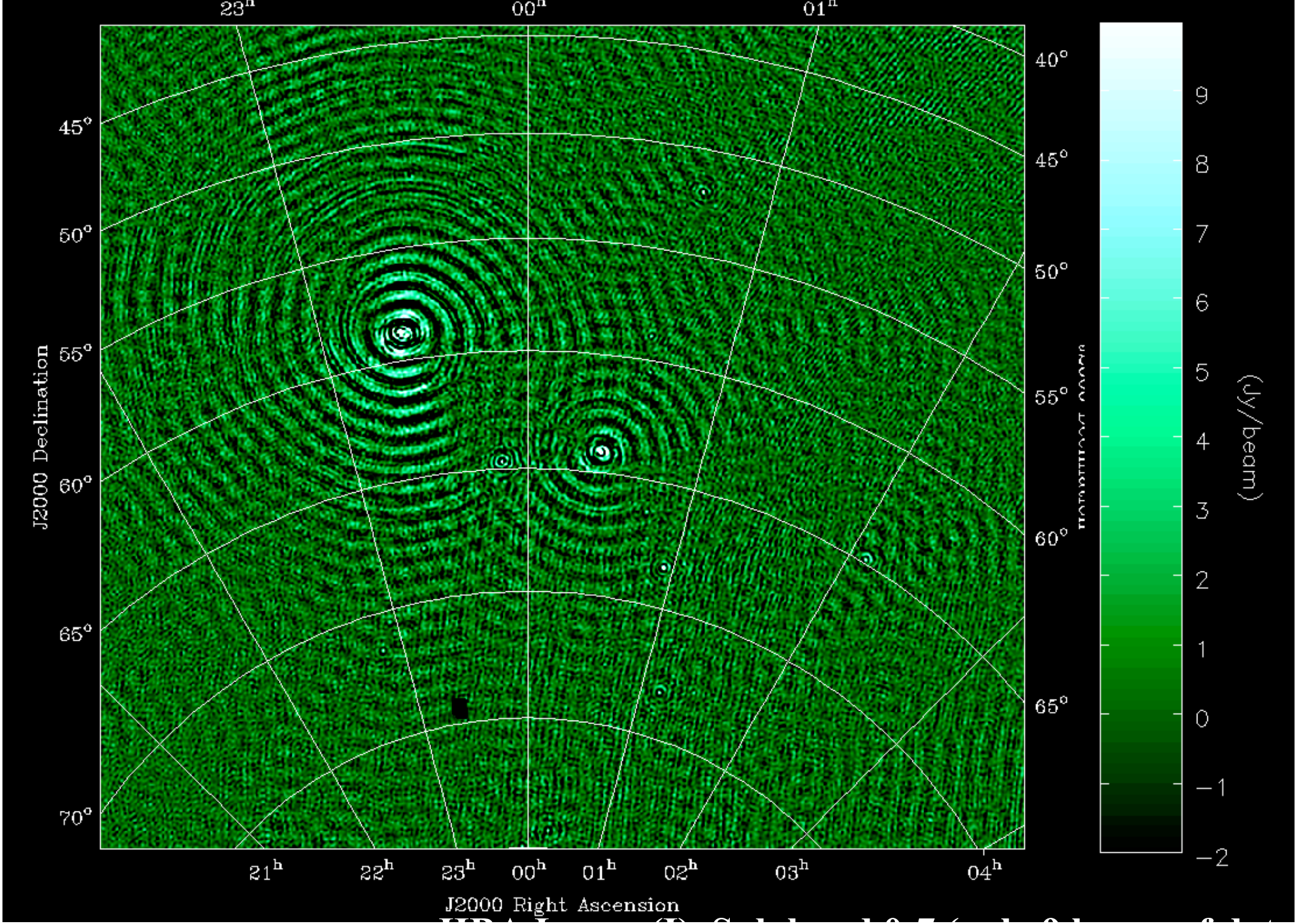
Movie

Processing HBA Observations

- L3743 (Aug 28, 07), …
- 36 subbands, from 209 MHz -243 MHz, phased at NCP.
- Same scheme of processing. CS10 Flagged completely
- Number of baselines ~40.
- Initial flagging -> solving complex gains for CasA and CygnusA
- Subtract CasA and CygnusA
- Correct for the direction of CasA
- Image using AIPS++ imager
- Individual Subband images, and then combined image

00°
J2000 Declination
0°
10°
10°
0°
06h
J2000 Right Ascension
0° 10° 10°
J2000 Declination
9
8
7
6
5
4
3
2
1
0
−1
−2
(Jy/beam)

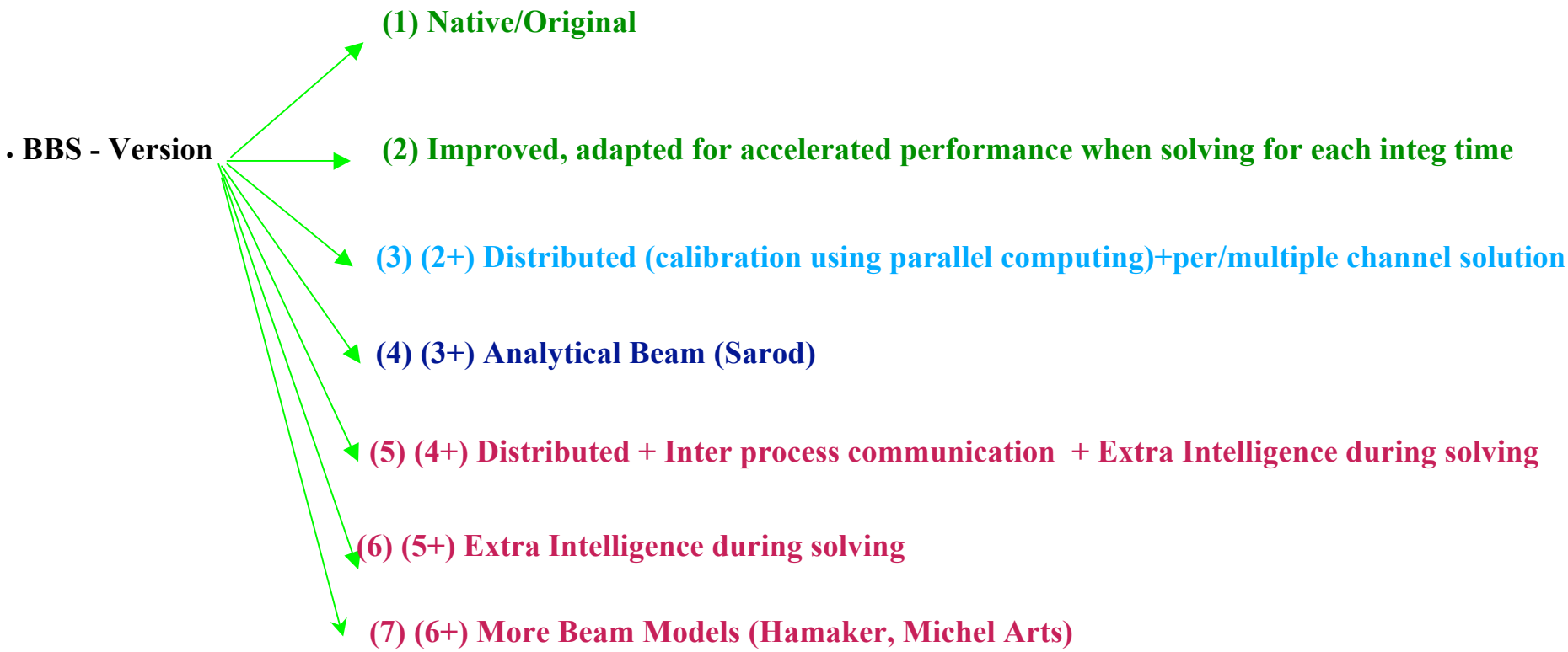

60°
65°
65°
60°
21h
18h
15h
12h
09h
60°
65°
65°
60°
J2000 Right Ascension
J2000 Declination
J2000 Right Ascension
(Jy/beam)
9
8
7
6
5
4
3
2
1
0
−1
−2


23h
00h
01h
40°
45°
50°
55°
60°
65°
70°
J2000 Declination
21h
22h
23h
00h
01h
02h
03h
04h
J2000 Right Ascension
(Jy/beam)
9
8
7
6
5
4
3
2
1
0
−1
−2

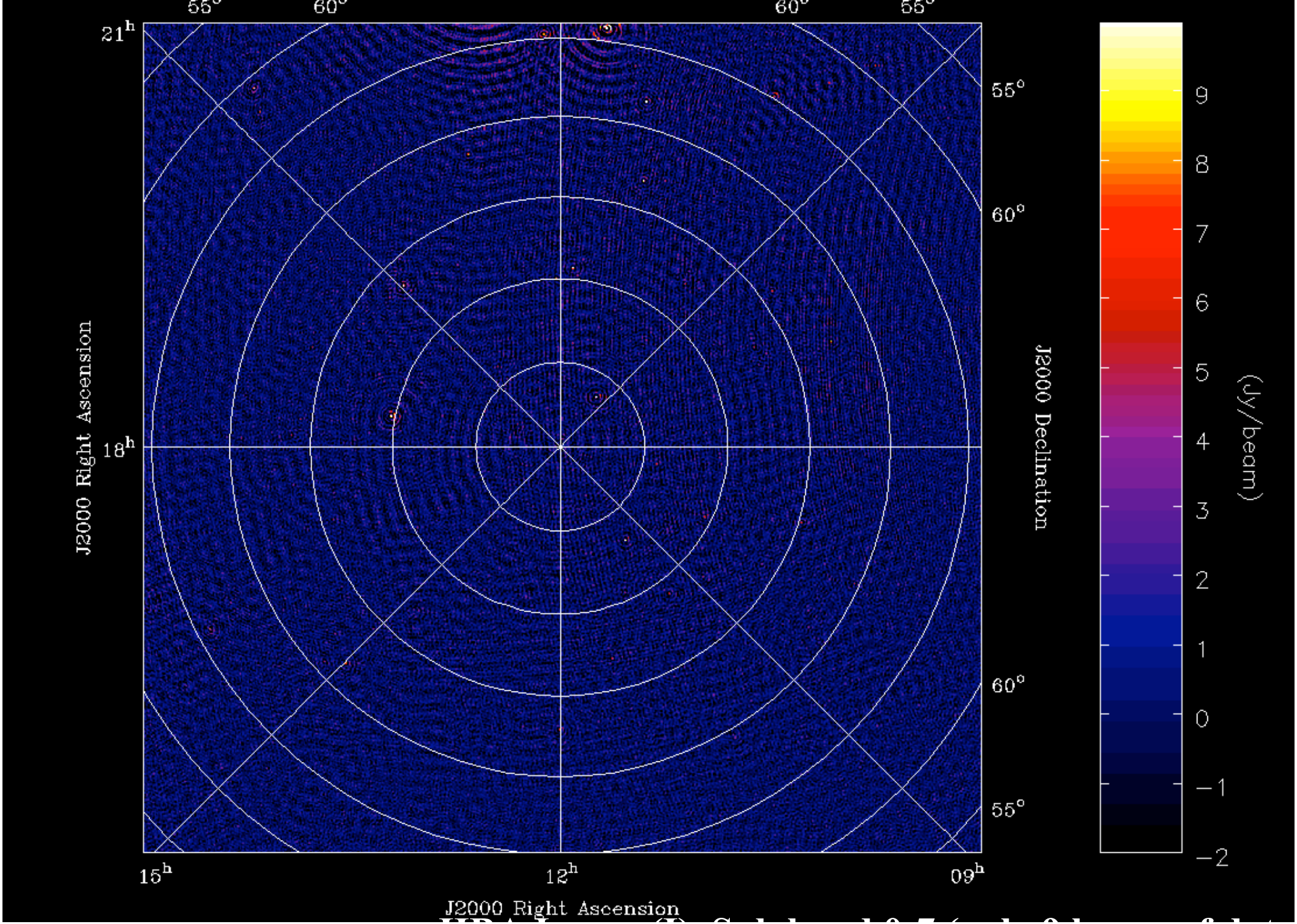
Next to Do.....

- Verify Positions
- Frequency dependent solutions (incl. sky model)
- Including analytical beam in processing
- Flux comparison
- Pipeline…
- and many many more!!

Progress -> Directions



. BBS – Automatic validation of versions!!


55°
60°
60°
55°
21h
55°
60°
J2000 Right Ascension
18h
J2000 Declination
60°
55°
9
8
7
6
5
4
3
2
1
0
−1
−2
(Jy/beam)
15h
12h
09h
J2000 Right Ascension