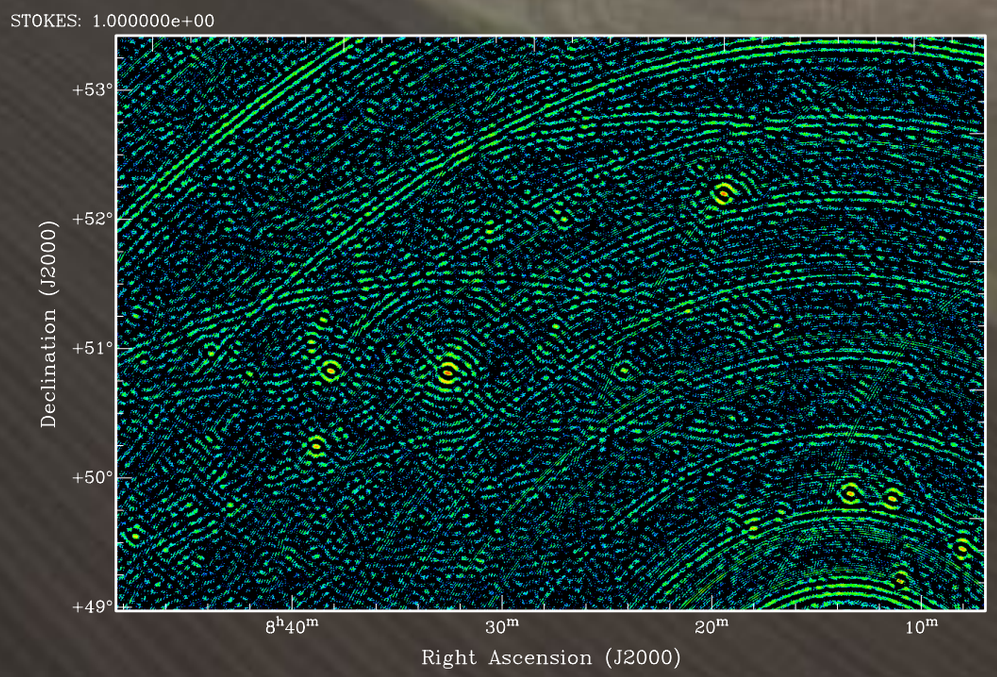


Image by Sarod Yatawatta

LOFAR Imaging
Busy Week I

LOFAR status meeting

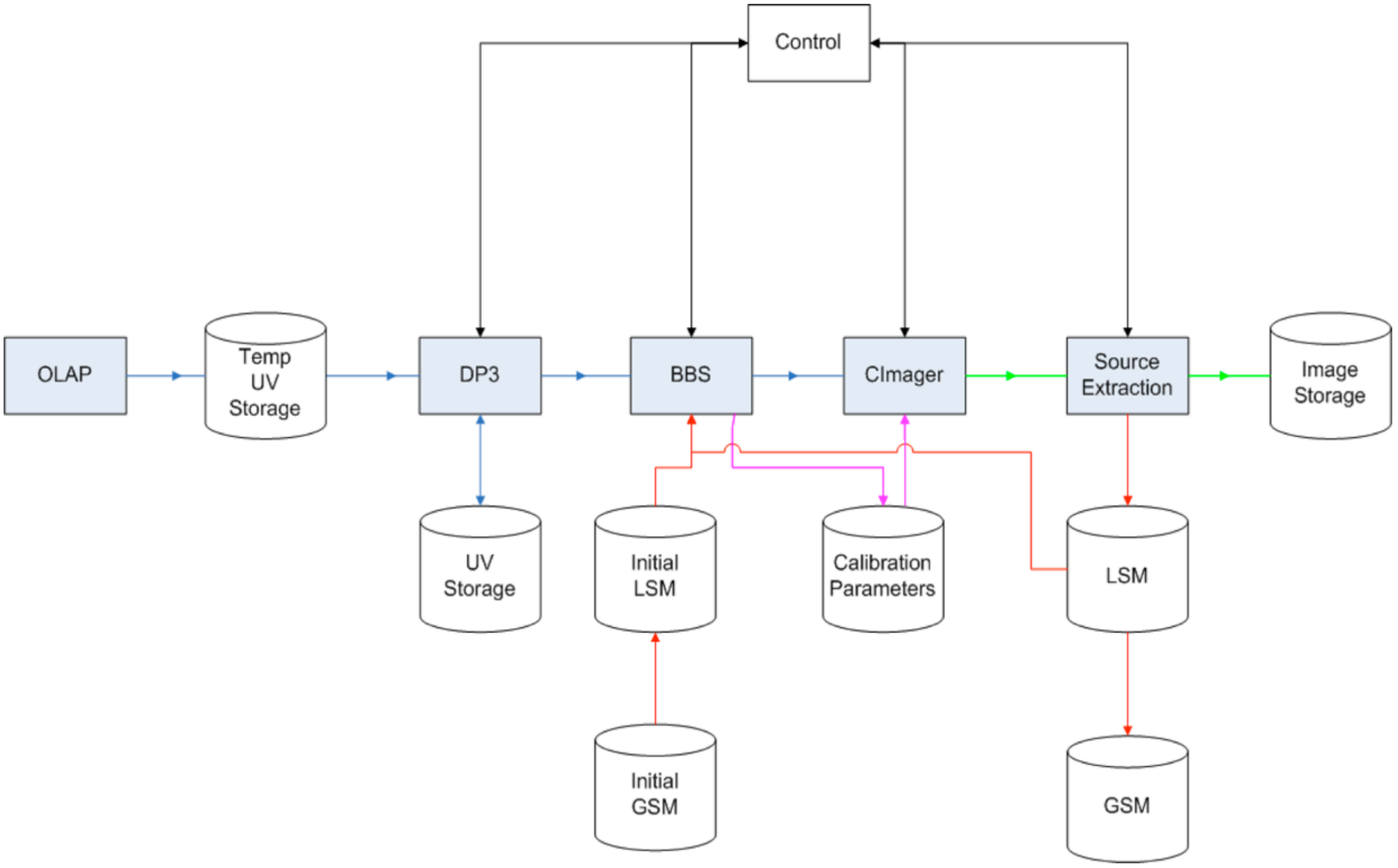
About the busy week....

- Brought to you by the Survey KSP - led by John McKean & myself.
- ~15 people here from across Europe
- Support from observatory staff, R&D and software people has been invaluable!
- Louise and Francesco even more invaluable.....

Goals of the busy week

- Implementing BBS on all subbands (more info about observations later...)
- Imaging / deconvolution (using cimager)
- Long baselines
- Image analysis (source detection & characterization)
- Ionospheric issues
- Primary beam and global bandpass (?)
- Overall goal: test all aspects of imaging pipeline... the “beat Sarod” project?

Imaging pipeline



Existing 3C196 data...

- Data calibrated and imaged by Sarod using MeqTrees
- LBA and HBA data, 3 stations (CS302, RS307, RS503)
- 72 subbands, 3 second integrations

LBA image

Our new observations

- Re-observation of the 3C196 field using LBA-inner.
  Now with 5 Dutch stations + 1 Effelsberg station. Still 72 SB / 5sec integration

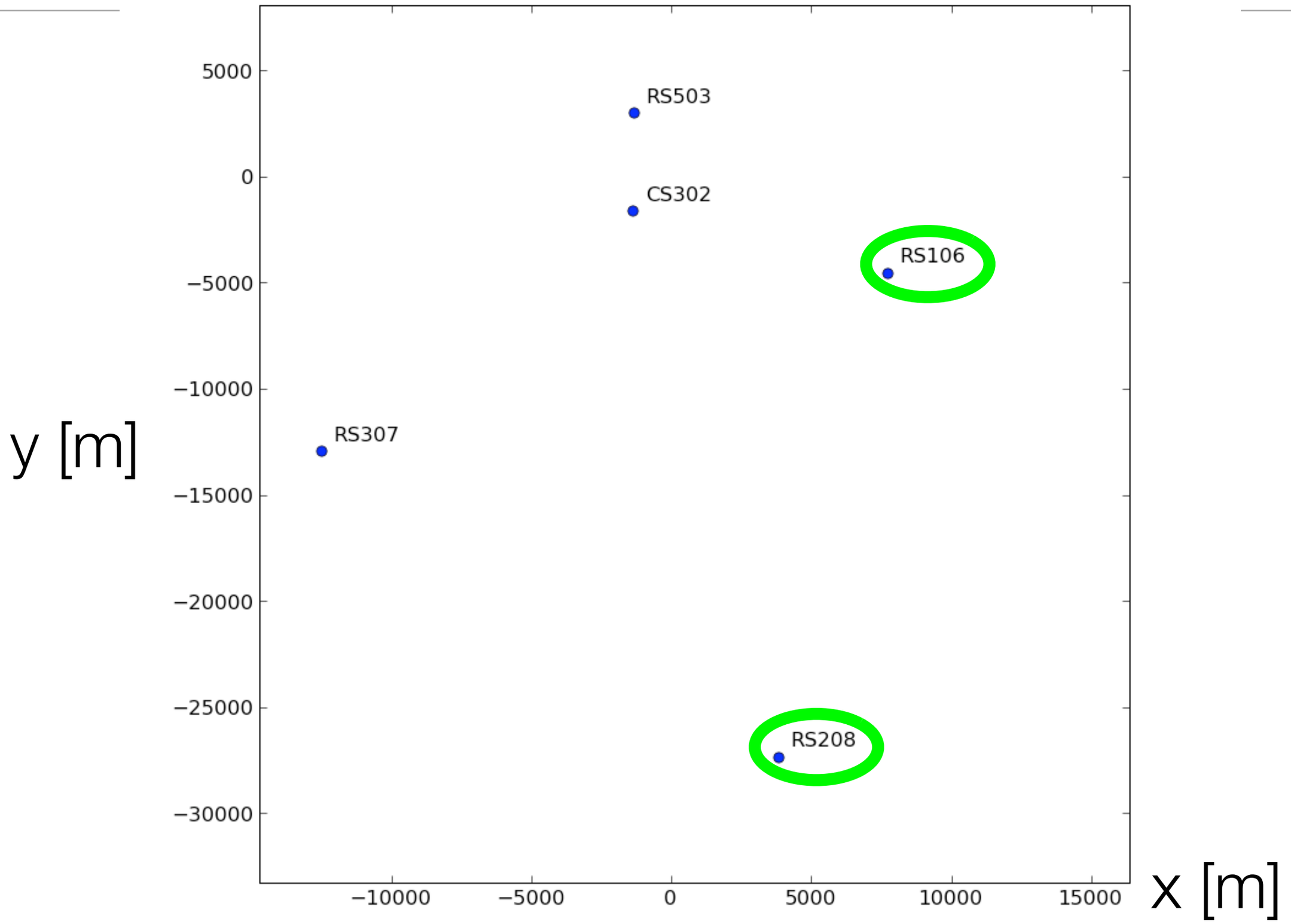
- Addition of RS106 and RS208 greatly improves the uv coverage.

- Observation set up to run over the weekend, starting in early afternoon of Friday 14 August till morning of Monday 17 August.

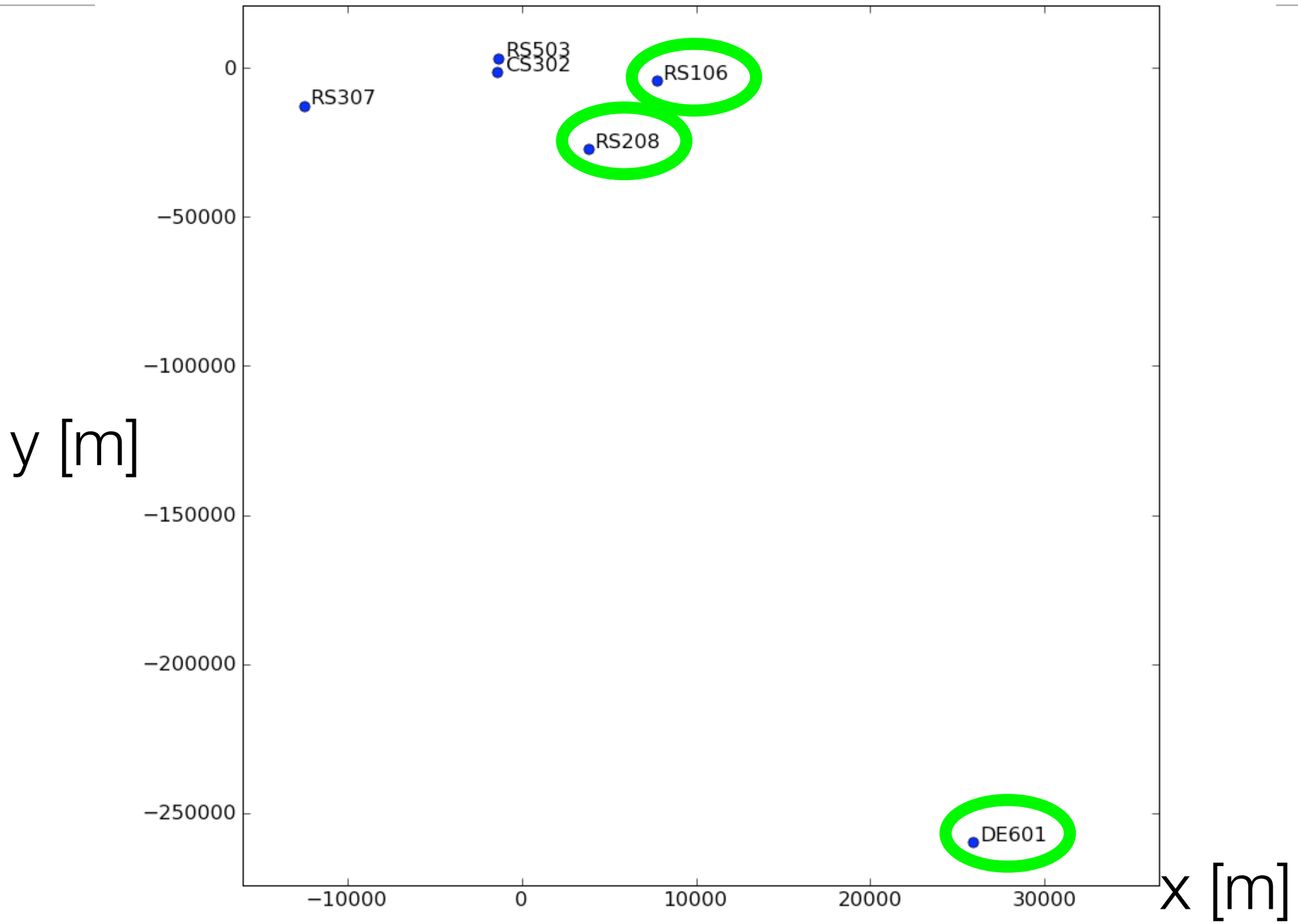
- Plan: copy data to processing cluster nodes Monday morning, run DPPP Monday afternoon, and calibrate starting Tuesday morning.

[NAIVE]

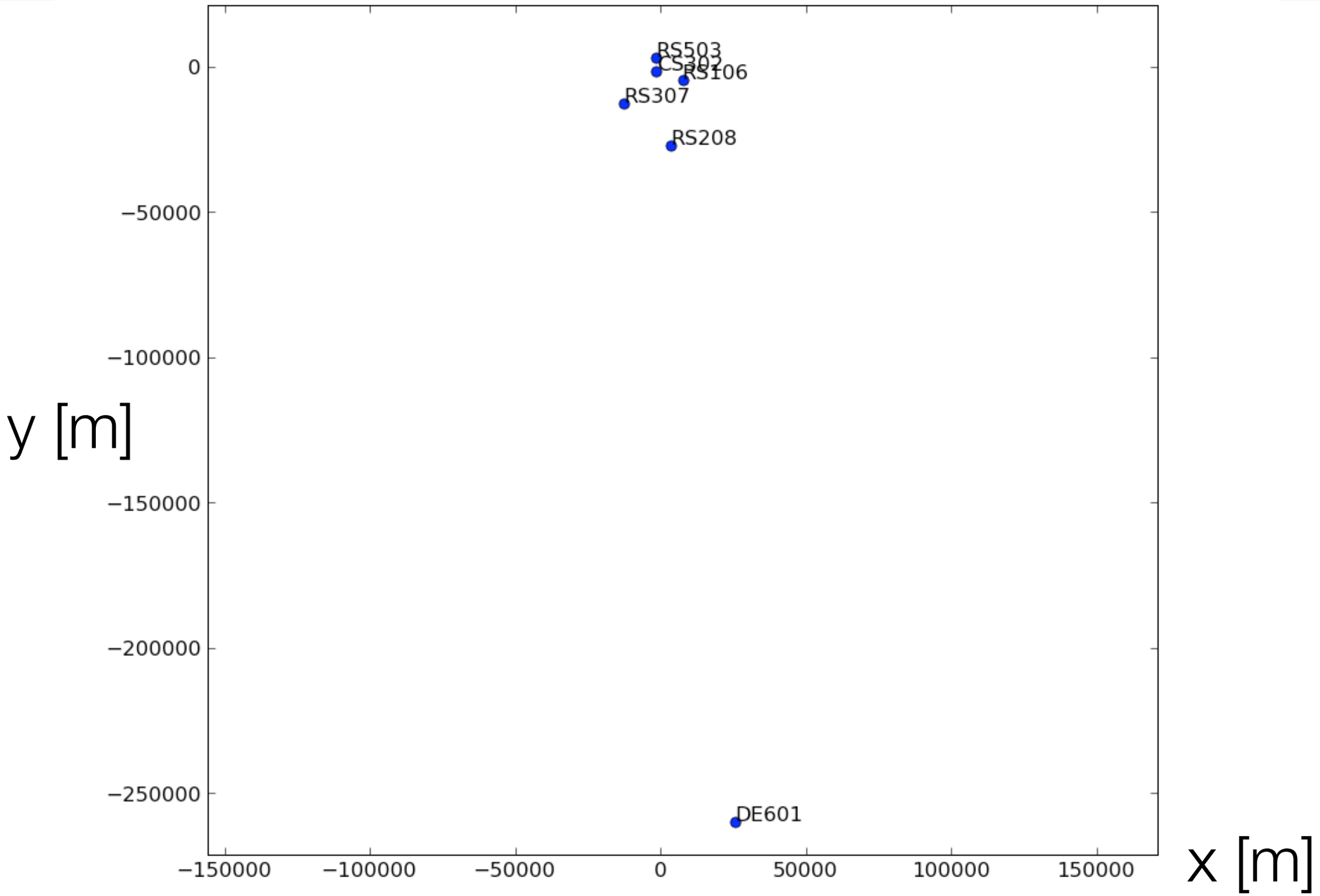
Station layout (Dutch stations)



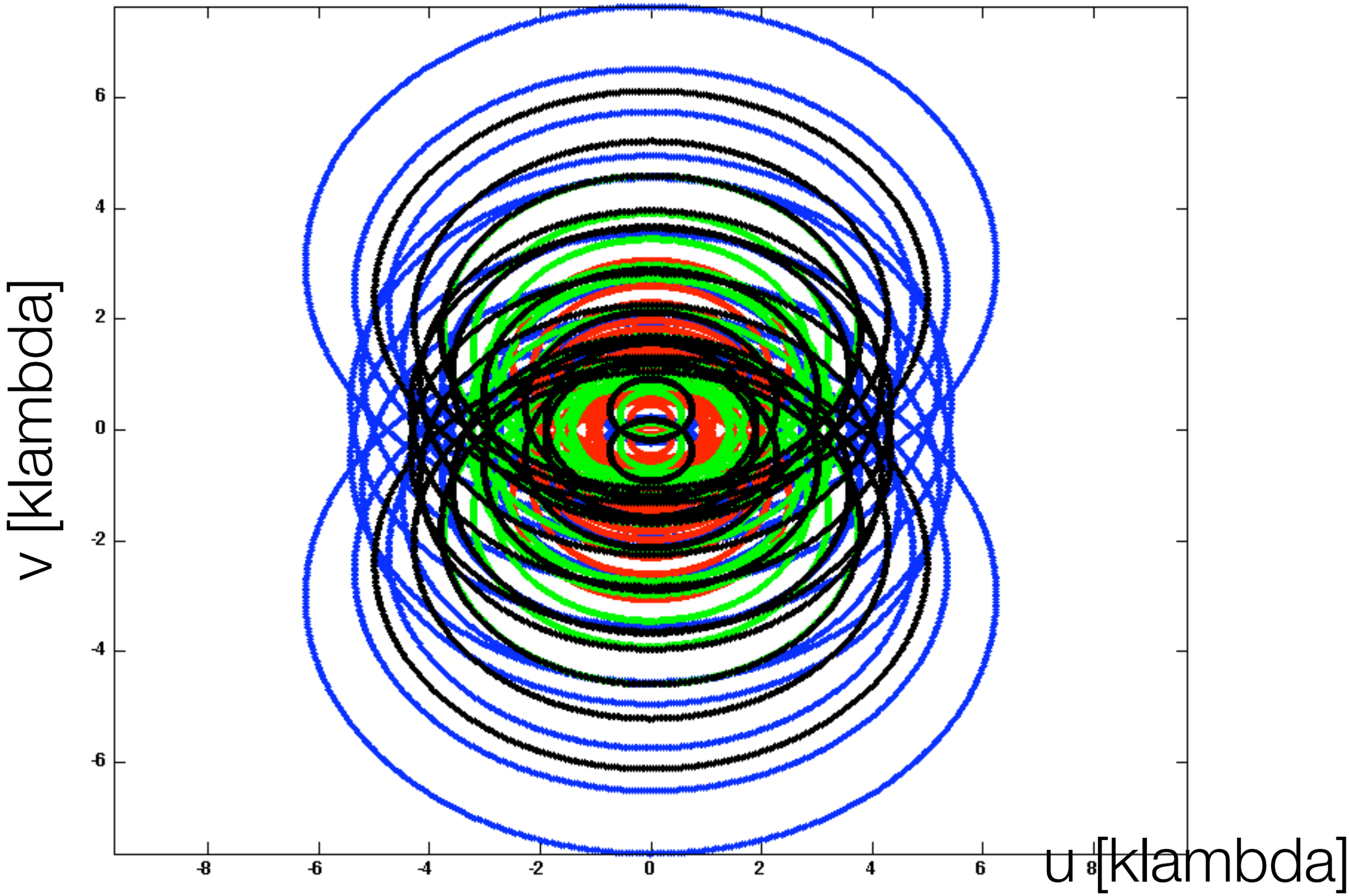
Station layout (all)



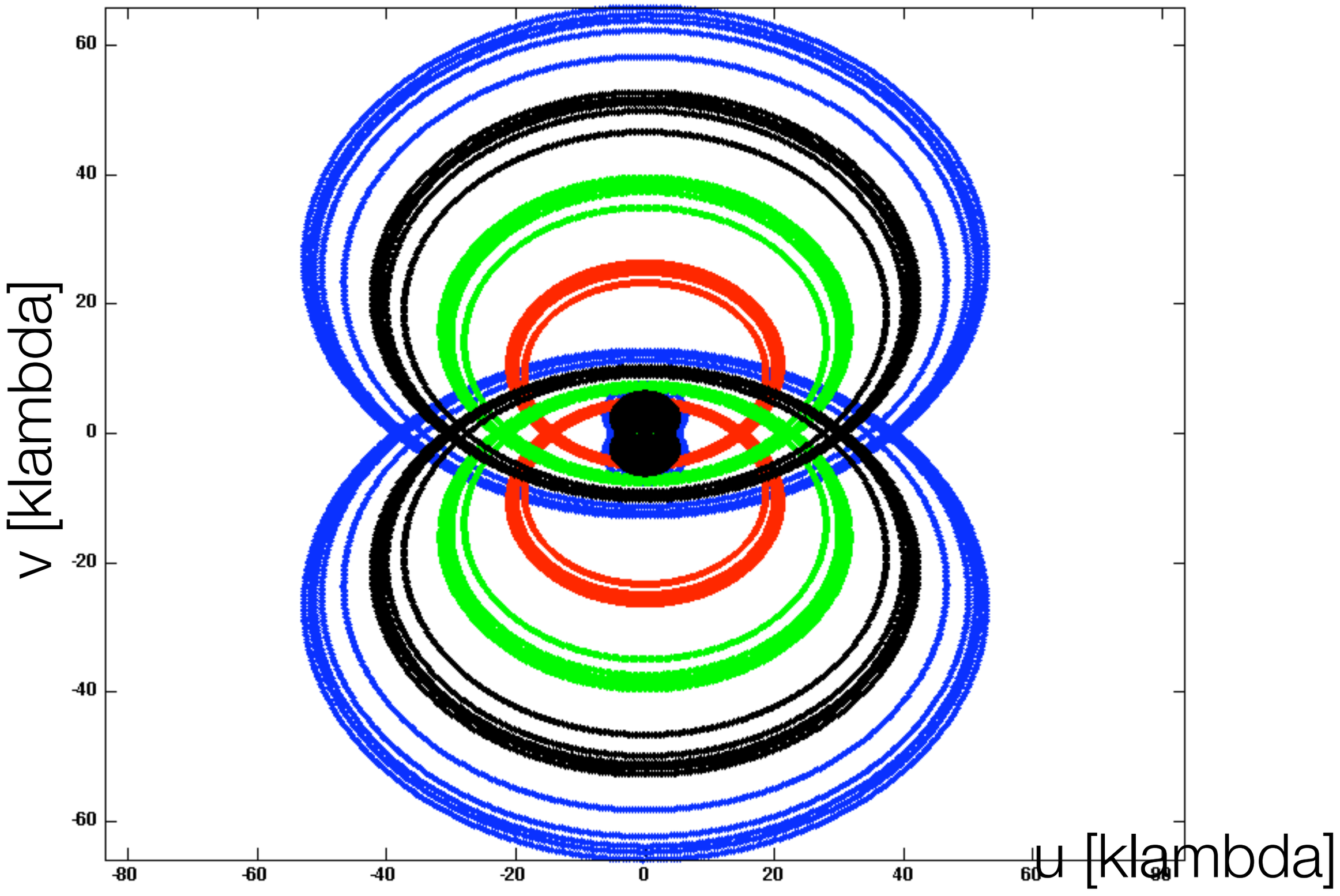
Station layout (all)



uv coverage (Dutch stations) @ dec of 3c196, 24hr



uv coverage (all stations) @ dec of 3c196, 24hr



Observation issues

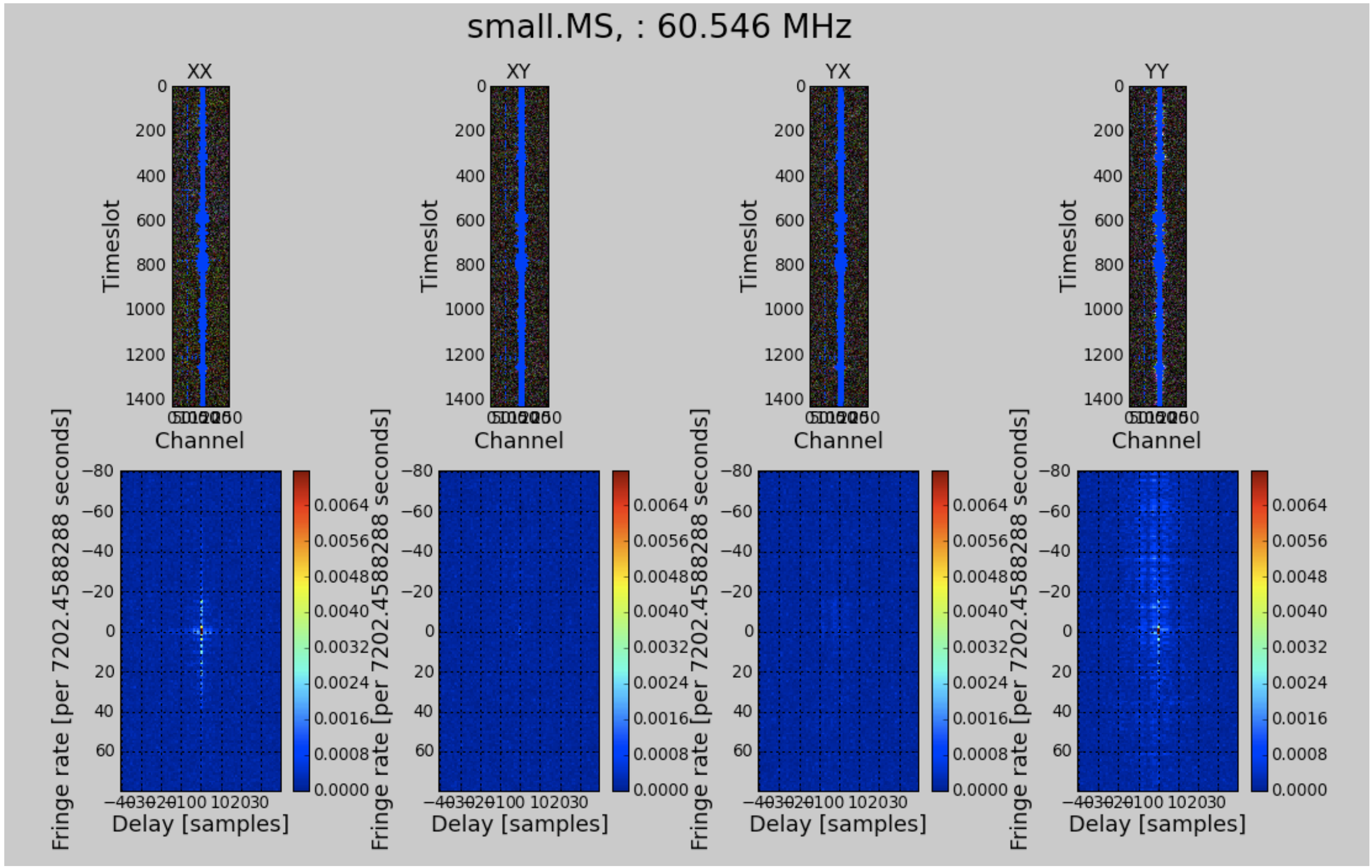
- Jason discovered on Friday that the Effelsberg station coordinates (lat,long) were flipped. This was fixed, and the station restarted while the observation was ongoing

- Ger analyzed the first data, and found no fringe on baselines with RS106 and RS208. This was tracked down (very quickly!) to a problem with the GPS coordinates - upshot: the station time was wrong. This too was fixed and the stations restarted.

- Observation continued for a while to allow clocks to stabilize, and restarted Saturday midday. Ger immediately found fringes on all Dutch baselines!

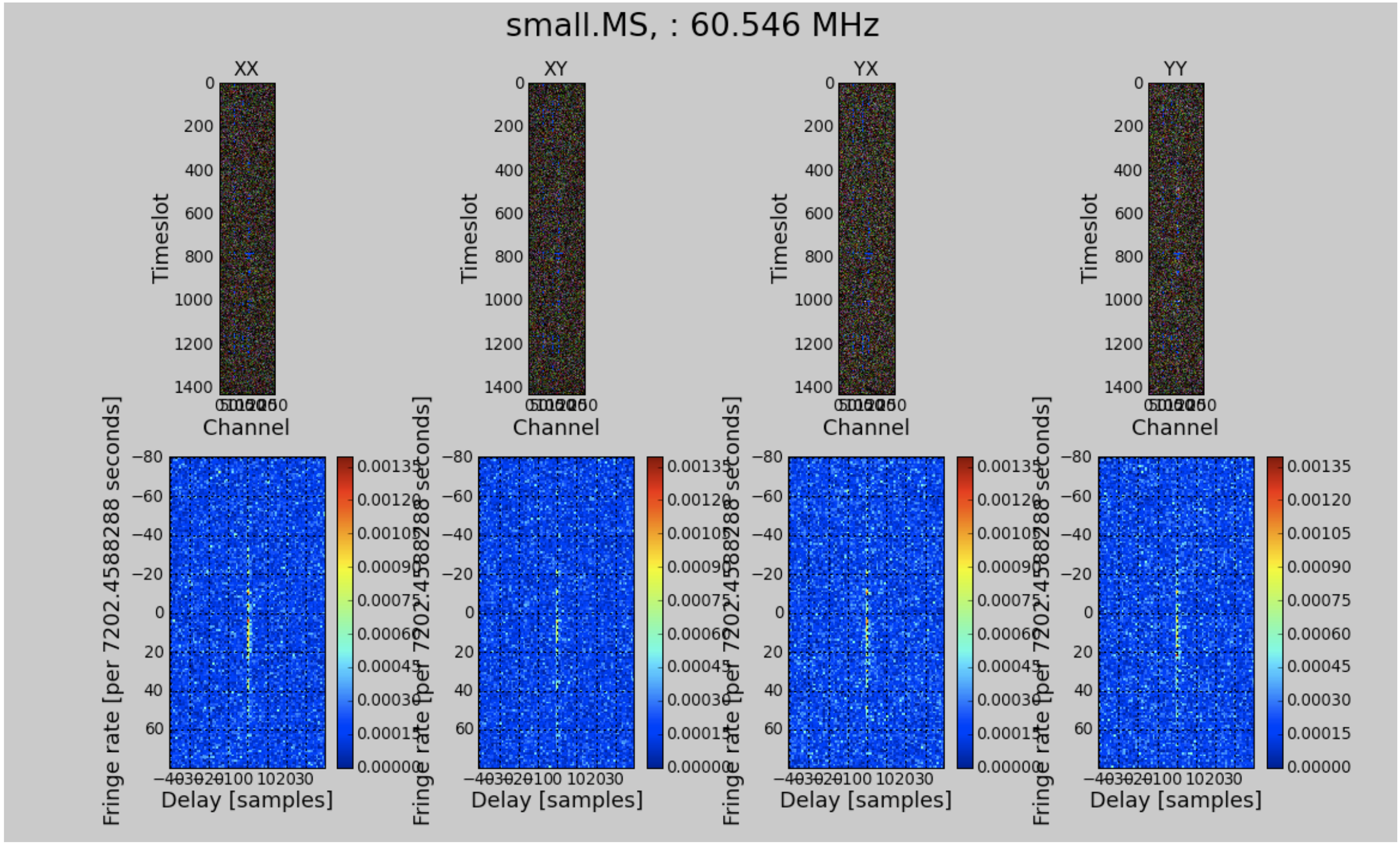
Fringe rate - delay plot CS302-RS503

- Using python script “borrowed” from Michiel.



Fringe rate - delay plot RS208-DE001

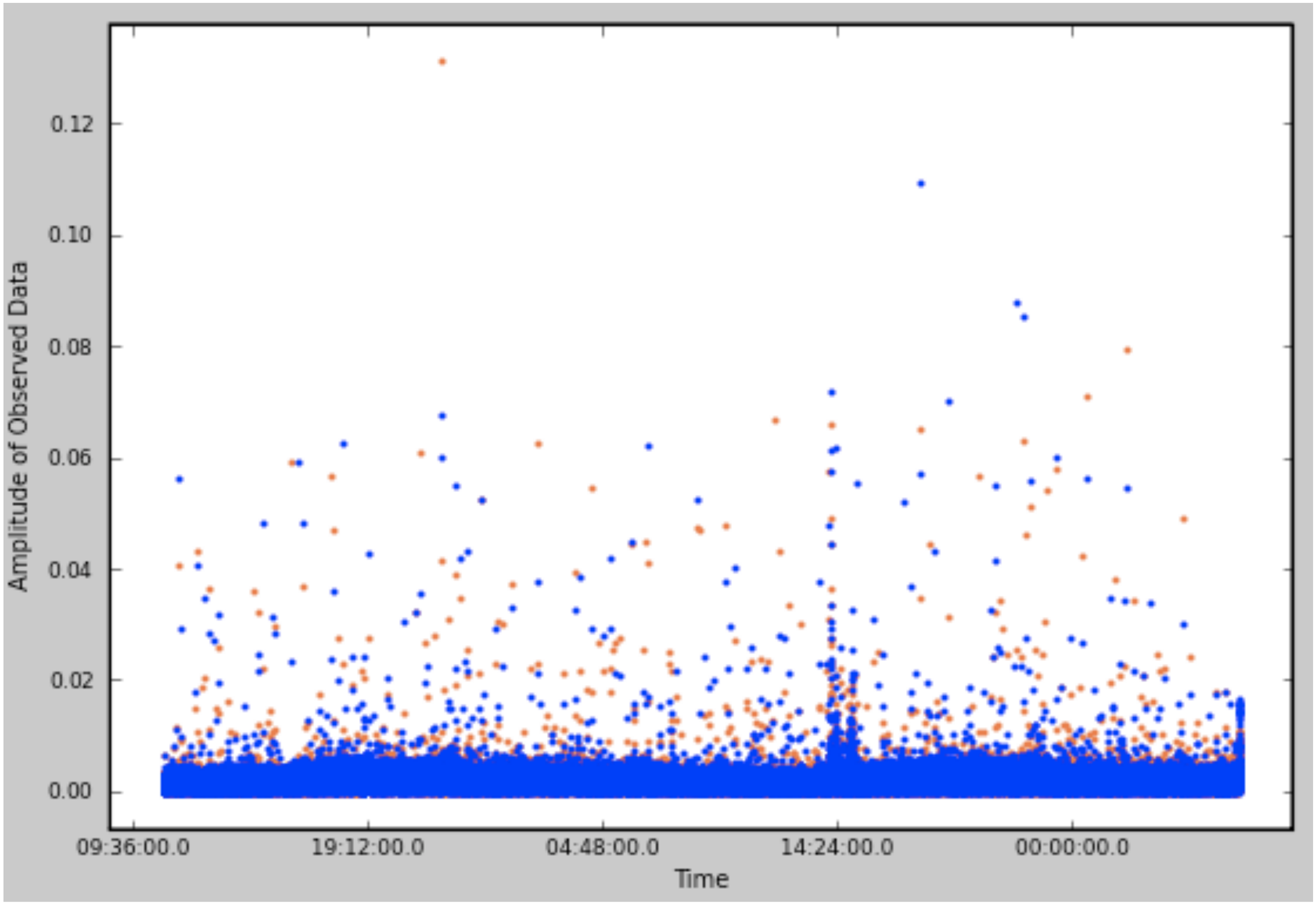
- Using python script “borrowed” from Michiel.



Software issues....

- Goal for DPPP:
    - Flagging (using MADFlagger; now dubbed “MADslowFlagger”)
        - MAD = Minimal Adjustment of Data ???
        - Compression (256 channels -> 1 channel, no averaging in time)
- Median filtering, so depends strongly on window size. Using suggested parameters - window size 21 - each subband takes ~4 hours to process. Significant RFI remained, due to interference lasting >~ 21 samples.

Some leftover RFI



Software issues....

- Shortlived new plan:
    - Compress data in frequency with minimal flagging
    - Flag (now much smaller) new dataset with larger time window.
- However.... DPPP will not take its own output as an input.
- (Temporary!!) solution: Manual flagging of the worst RFI using casapy. Later today we will use these datasets to continue calibrating .....
- Sidenote: at the moment, difmap (+ Neal) = more effective than our imaging pipeline..... (but of course to be fair, it lacks several required features)

Software issues....

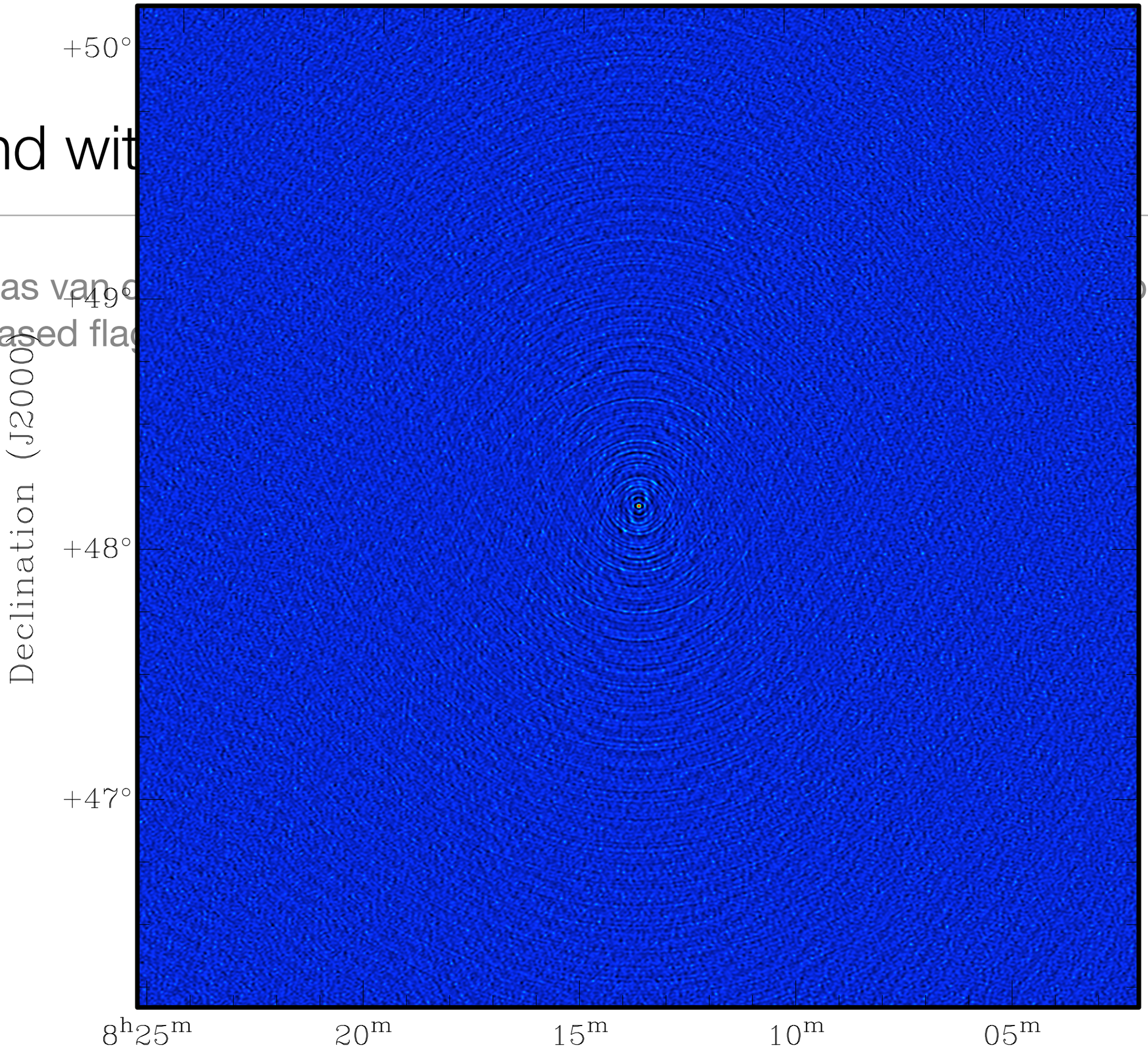
- Next problem: BBS expects a CORRECTED_DATA column, which is not added to the MS by DPPP. This has to be fixed manually.

- Next next problem: DPPP writes incorrect UVW coordinates to the output MS (beginning and end of observation; center times are OK).
    - This led to mirroring and source position errors in maps produced with the MS output from DPPP.
    - This too must be fixed by hand - Sarod and Louise have worked around this issue yesterday.

- The UVW issue may be fixed in a new version of DPPP, which may run starting today. This requires testing!

End wit

- Bas van c lution-based flag bug).



Stay tuned.....

- we work till end of day on Friday.... there will be more progress (and daily images) before then!