ASTRON

Netherlands Institute for Radio Astronomy

Imaging Pipeline Status

George Heald
LSM 30-06-2010

ASTRON is part of the Netherlands Organisation for Scientific Research (NWO)

LOFAR

Outline

- What is needed to make the pipeline fully automated (in other words, what do we need - on the software side - to be minimally ready for hands-off post-observation processing?)

Outline

- What is needed to make the pipeline fully automated (in other words, what do we need - on the software side - to be minimally ready for hands-off post-observation processing?)

- What this is not:
  - a pretty picture extravaganza
  - a commissioning to-do list
  - an MSSS plan (still needs definition)

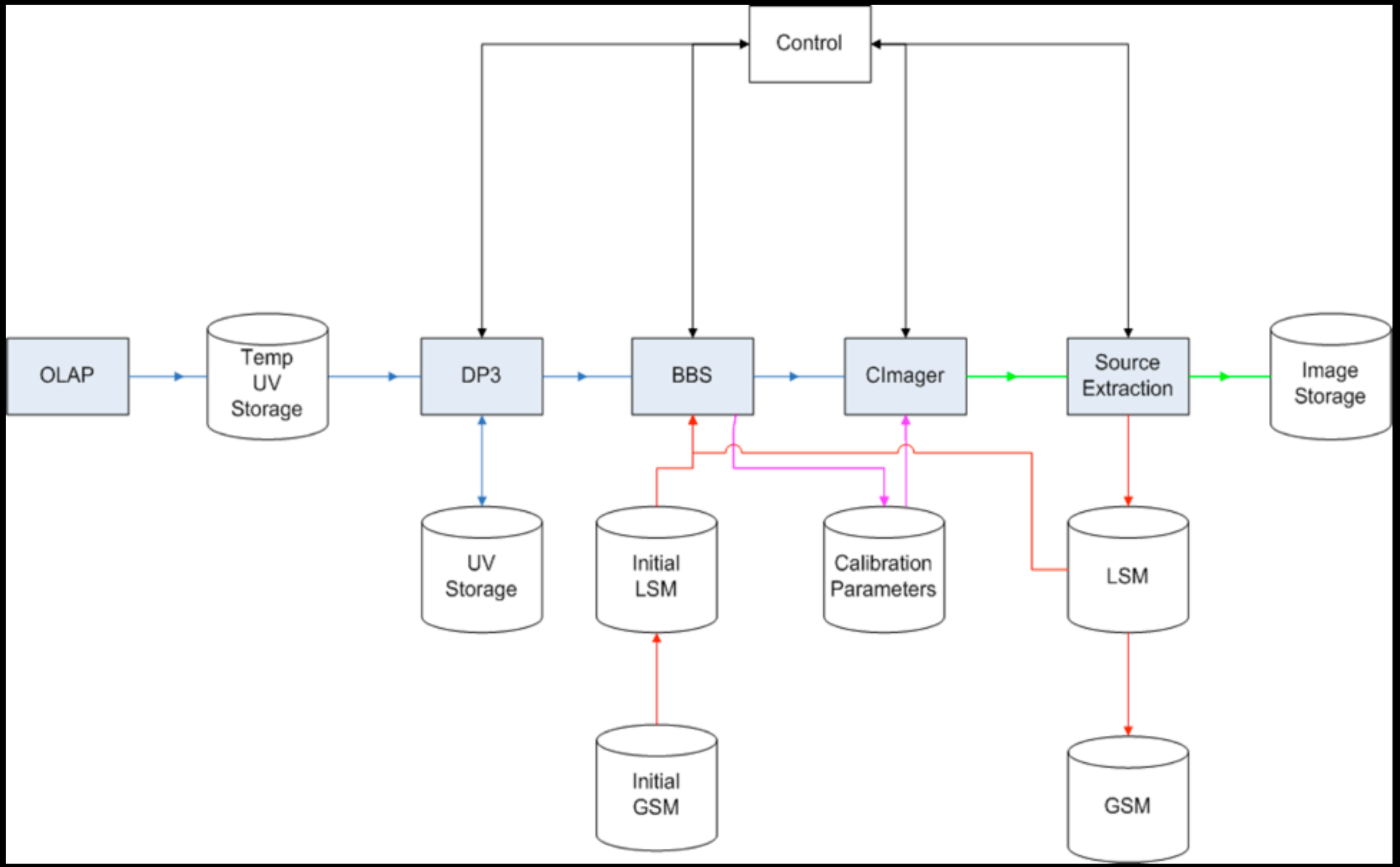
Outline

- What is needed to make the pipeline fully automated (in other words, what do we need - on the software side - to be minimally ready for hands-off post-observation processing?)

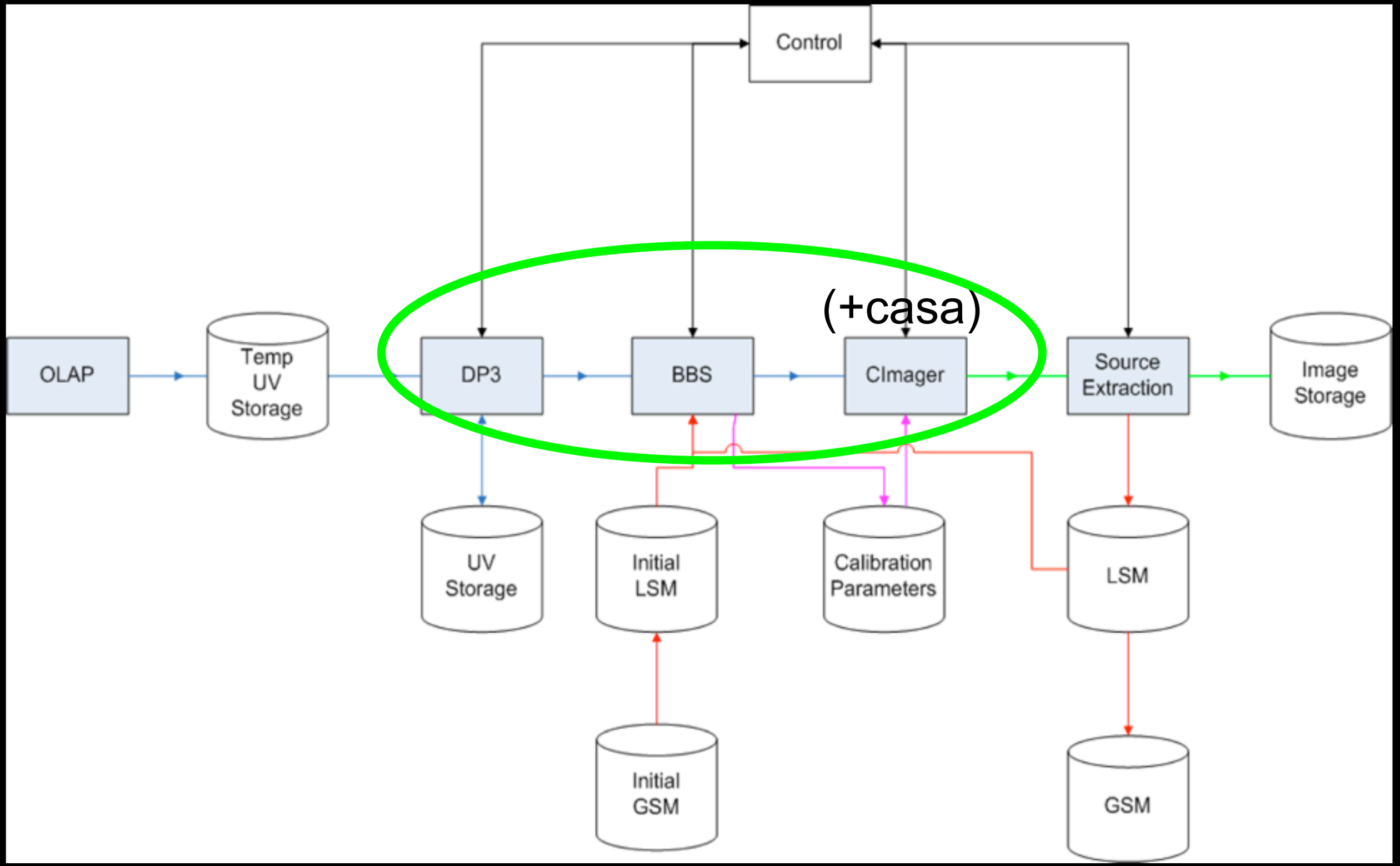
- What this is not:
  - a pretty picture extravaganza
  - a commissioning to-do list
  - an MSSS plan (still needs definition)

- What this is:
  - an attempt to focus the huge list of stuff to do (and get feedback .....)

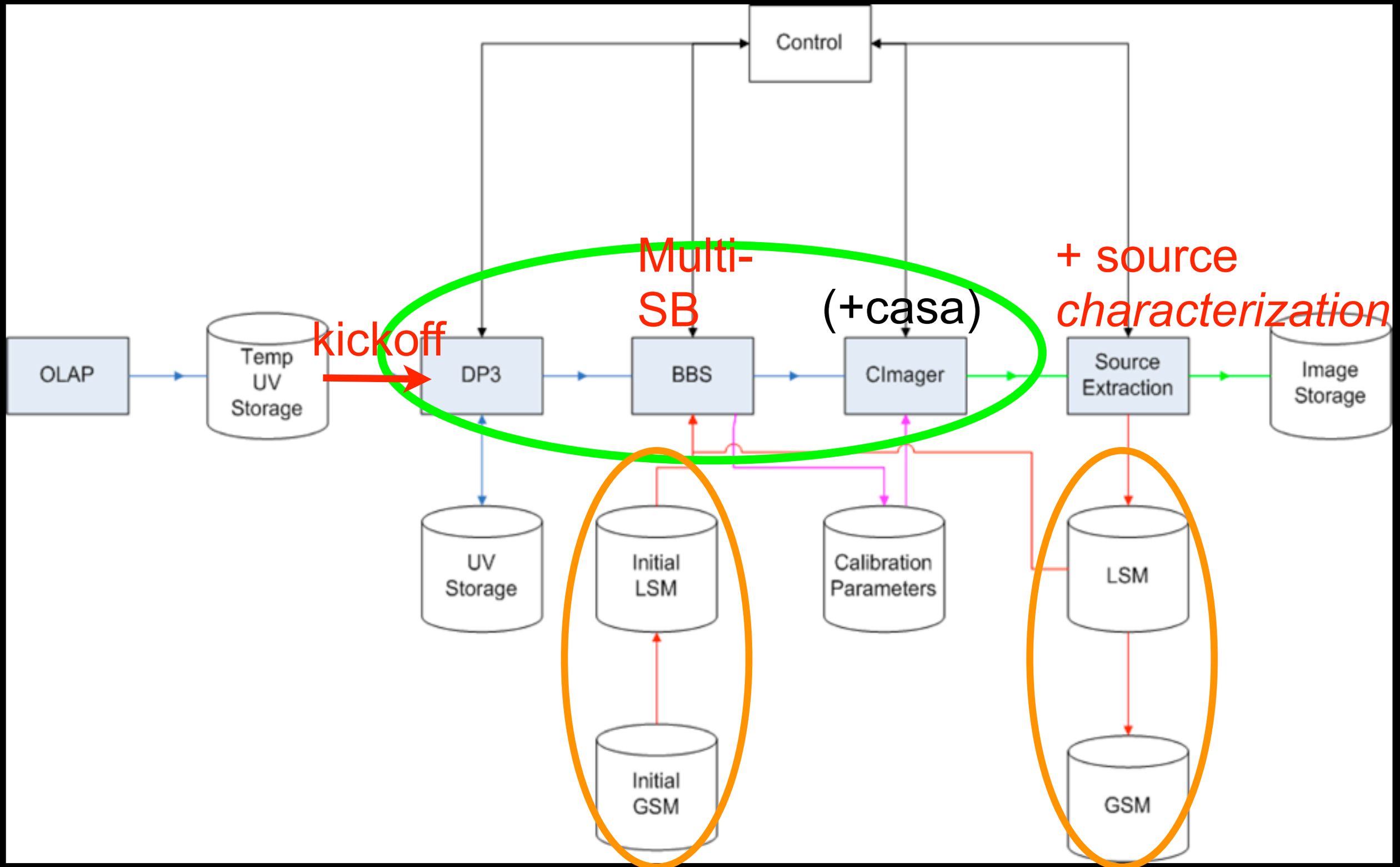
The pipeline



The pipeline: what's in place?



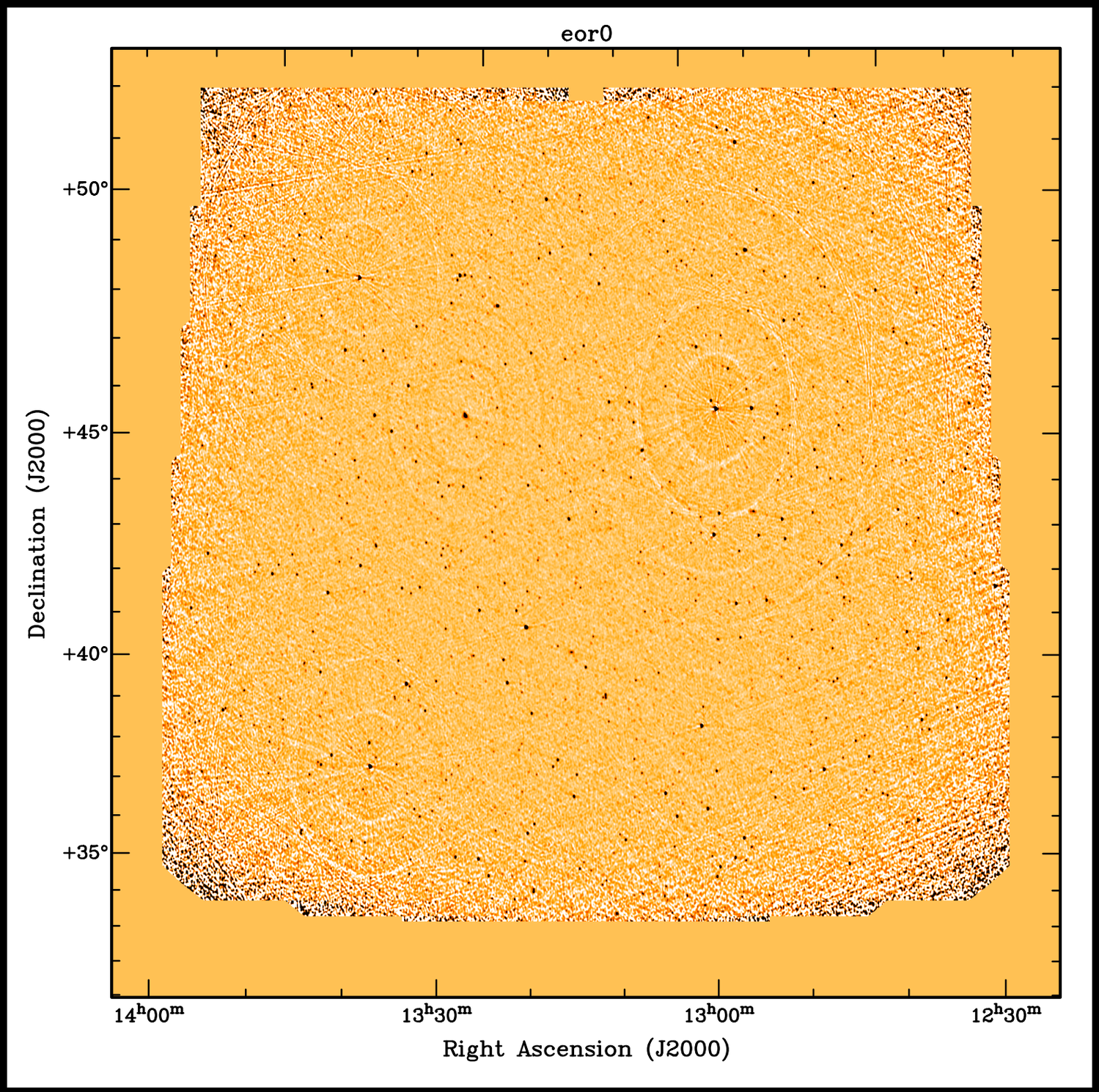
The pipeline: what remains?



Making images for the opening

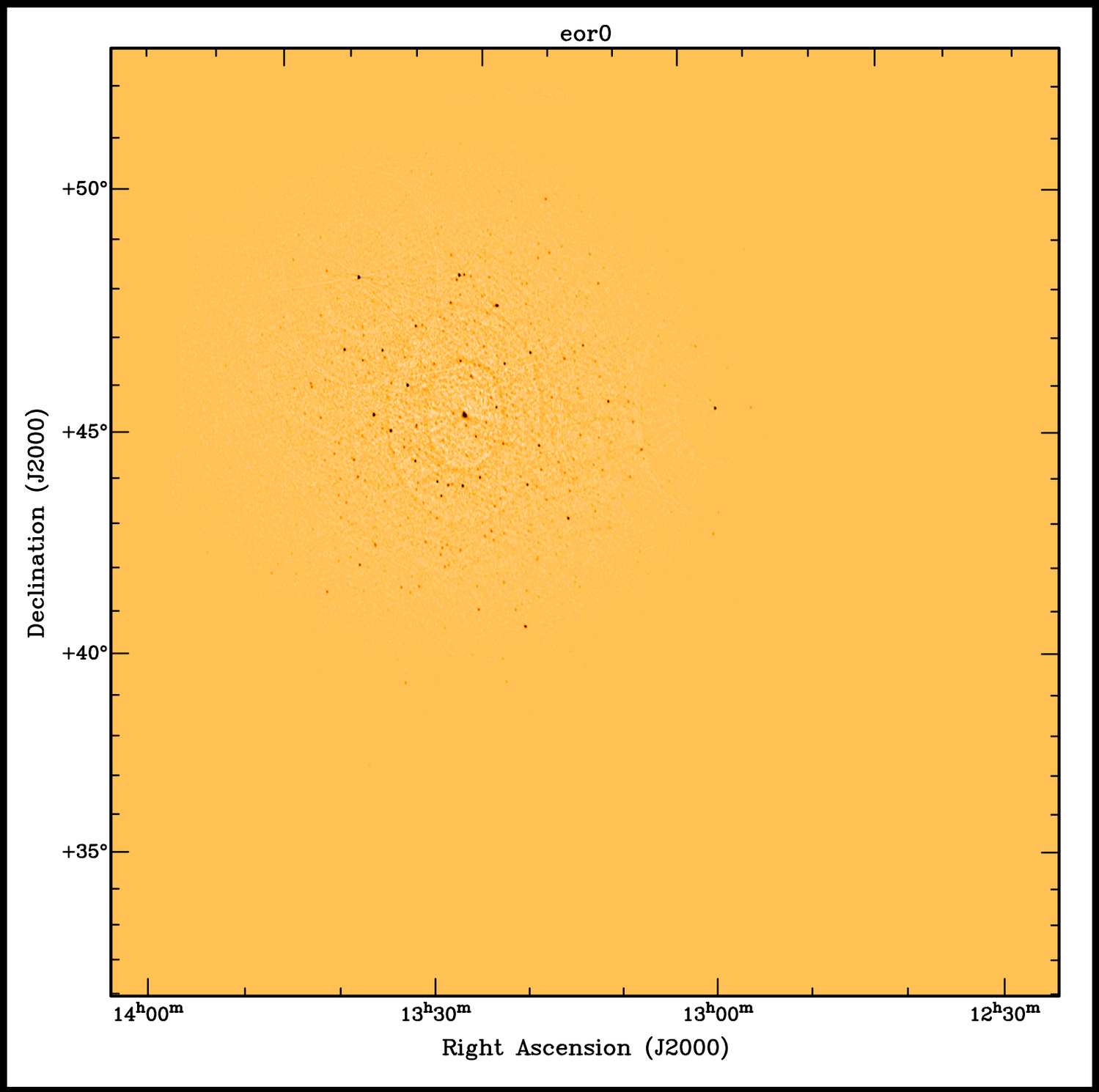
- For the opening, making images consisted of:
  1. Make an initial sky model by hand - from catalogs and, in case of M51 field, LFFE data courtesy GdB
  2. Run the pipeline to perform the NDPPP stage on all SBs
  3. Calibrate SBs independently with BBS (or difmap, or AIPS...) using hand-crafted initial sky model
  4. Image the calibrated data, using casapy (or difmap)
  5. Update sky model using temporary sky definition (e.g. after deconvolution with casapy2bbs)
  6. Rerun calibration routine (again, each SB independently)
  7. Combine subbands (using script by Oleg or casapy) and produce new image

M51 field



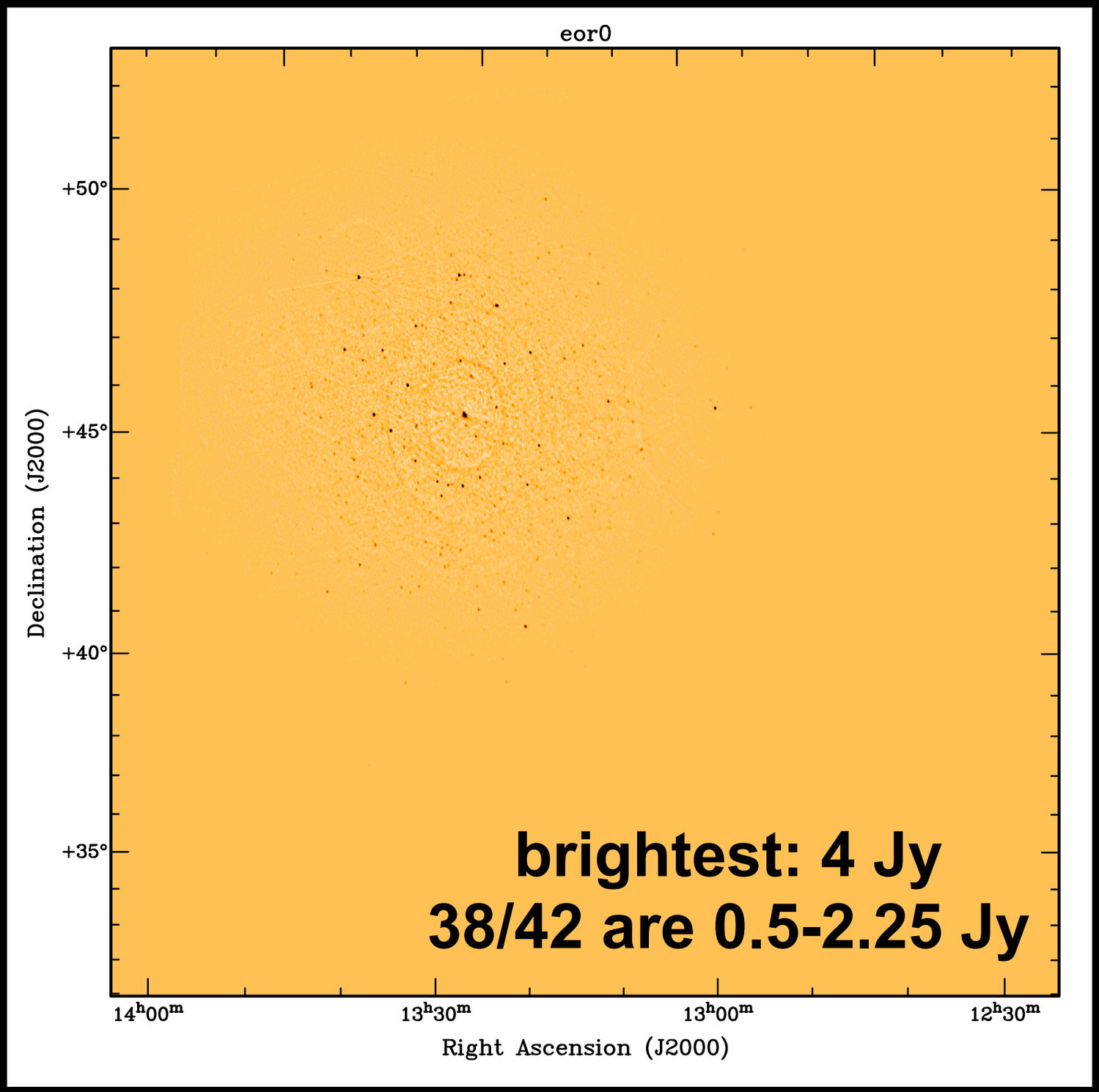
WSRT LFFE (GdB)

M51 field



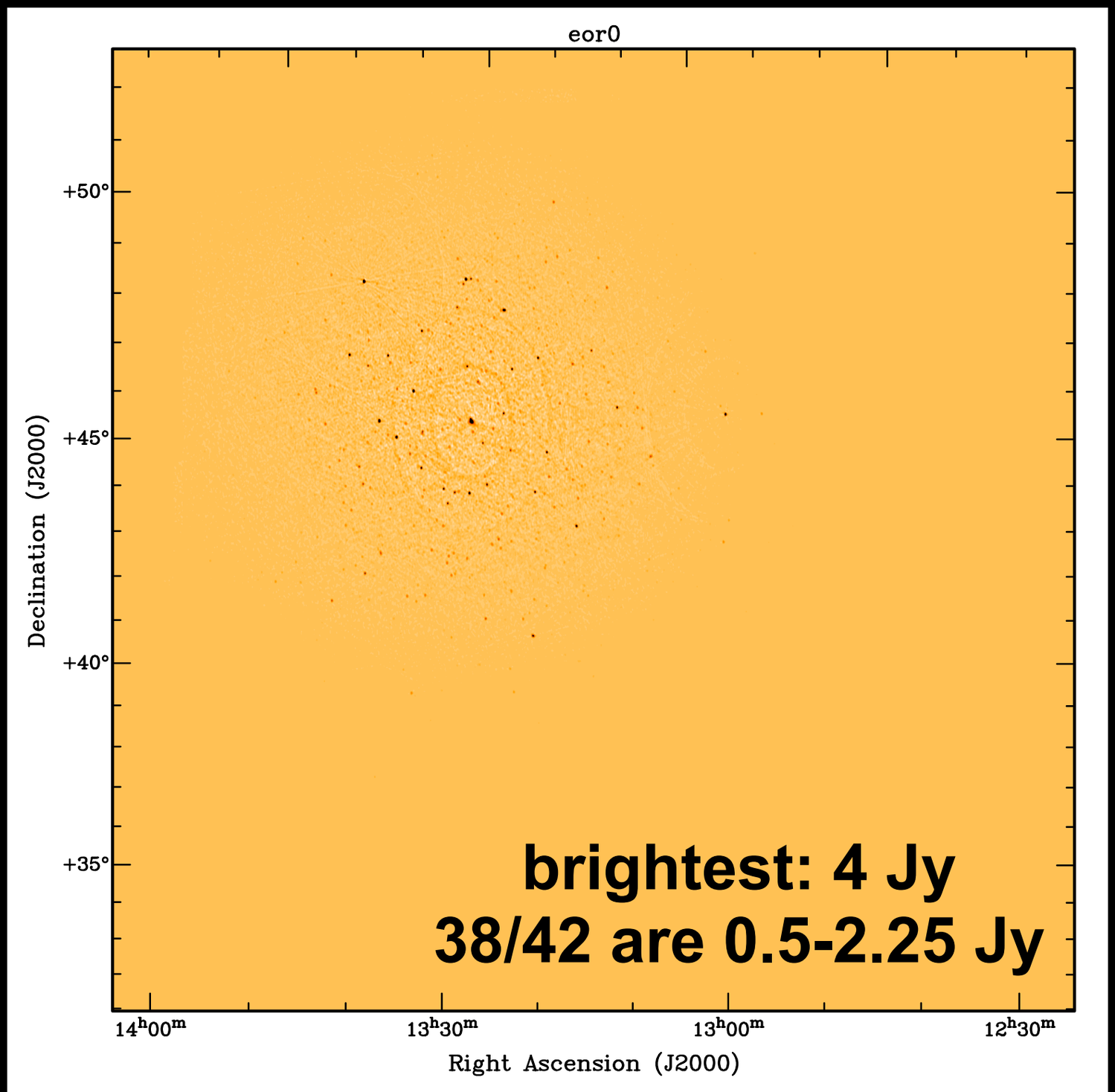
WSRT LFFE (GdB)

M51 field

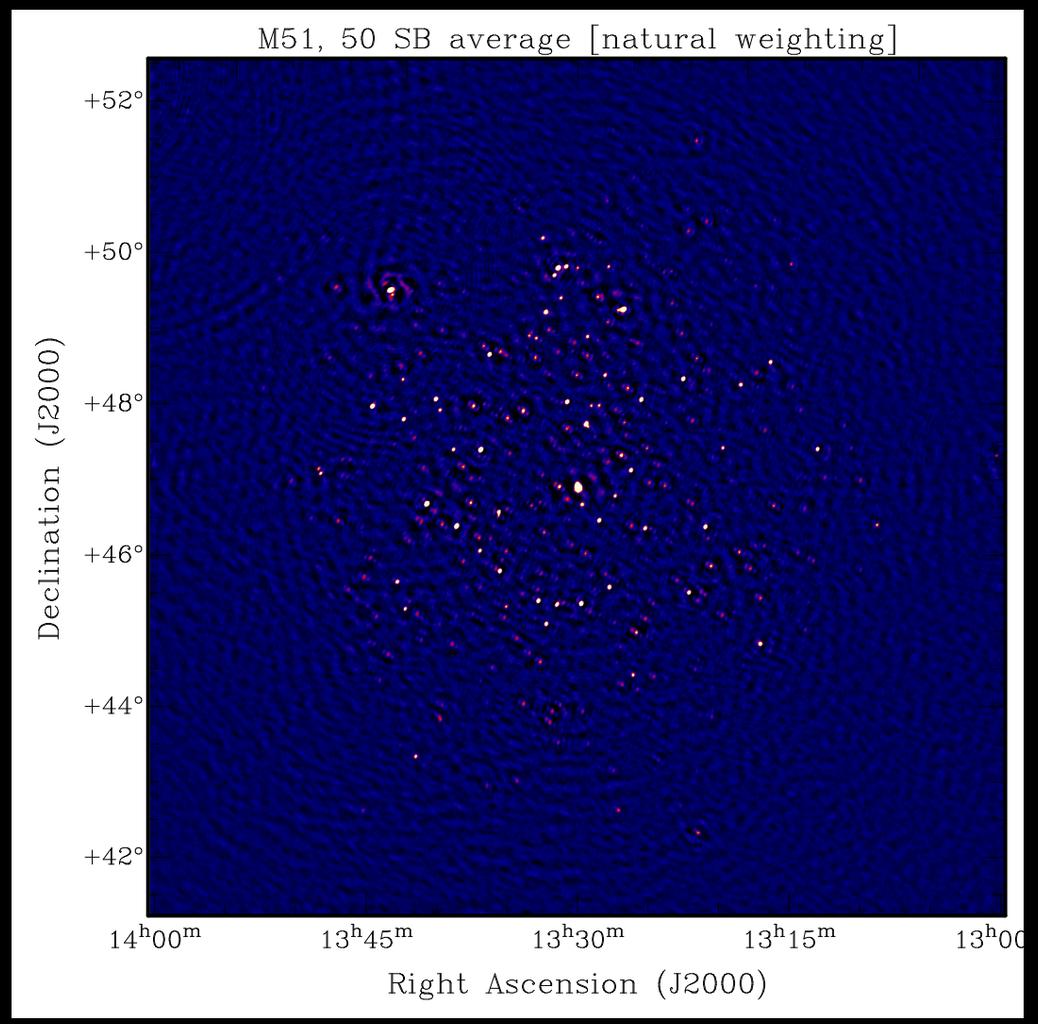


WSRT LFFE (GdB)

M51 field



WSRT LFFE (GdB)



LOFAR HBA

Making images for the opening

- For the opening, making images consisted of:
  1. Make an initial sky model by hand - from catalogs and, in case of M51 field, LFFE data courtesy GdB
  2. Run the pipeline to perform the NDPPP stage on all SBs
  3. Calibrate SBs independently with BBS (or difmap, or AIPS...) using hand-crafted initial sky model
  4. Image the calibrated data, using casapy (or difmap)
  5. Update sky model using temporary sky definition (e.g. after deconvolution with casapy2bbs)
  6. Rerun calibration routine (again, each SB independently)
  7. Combine subbands (using script by Oleg or casapy) and produce new image

First steps to include skymodels

- A lot of offline work has been going on to interface the GSM/LSM with the calibration:
  - Bart Scheers has a first script to extract source lists, from a catalog (VLSS+WENSS+NVSS) database, for a particular field

First steps to include skymodels

- A lot of offline work has been going on to interface the GSM/LSM with the calibration:
  - Bart Scheers has a first script to extract source lists, from a catalog (VLSS+WENSS+NVSS) database, for a particular field
    - Still needs testing...

First steps to include skymodels

- A lot of offline work has been going on to interface the GSM/LSM with the calibration:
  - Bart Scheers has a first script to extract source lists, from a catalog (VLSS+WENSS+NVSS) database, for a particular field
    - Still needs testing...
  - TKP has work ongoing to detect and characterize point source / gaussians (same algorithm as used by Niruj), and feed these back into LSM
    - Subsequent DB query (as above) gives new skymodel
    - Again, testing needed

First steps to include skymodels

- A lot of offline work has been going on to interface the GSM/LSM with the calibration:
  - Bart Scheers has a first script to extract source lists, from a catalog (VLSS+WENSS+NVSS) database, for a particular field
    - Still needs testing...
  - TKP has work ongoing to detect and characterize point source / gaussians (same algorithm as used by Niruj), and feed these back into LSM
    - Subsequent DB query (as above) gives new skymodel
    - Again, testing needed
- Sarod is working on a program which characterizes extended sources, including shapelets (which would also need to be implemented in BBS) and doubles

Still needed....

- Determination of major cycle algorithm to put in pipeline (fixed number of iterations? stop criterion?)
  - Experience with WENSS indicates that 2-3 different algorithms are needed, depending on particular field

Still needed....

- Determination of major cycle algorithm to put in pipeline (fixed number of iterations? stop criterion?)
  - Experience with WENSS indicates that 2-3 different algorithms are needed, depending on particular field
- Testing & development !

Still needed....

- Determination of major cycle algorithm to put in pipeline (fixed number of iterations? stop criterion?)
  - Experience with WENSS indicates that 2-3 different algorithms are needed, depending on particular field
- Testing & development !
- Plan for combining subbands in calibration step

Still needed....

- Determination of major cycle algorithm to put in pipeline (fixed number of iterations? stop criterion?)
  - Experience with WENSS indicates that 2-3 different algorithms are needed, depending on particular field
- Testing & development !
- Plan for combining subbands in calibration step

- Take home message: Focus needed on commissioning the interface between the pipeline and the skymodel DBs

Still needed....

- Determination of major cycle algorithm to put in pipeline (fixed number of iterations? stop criterion?)
  - Experience with WENSS indicates that 2-3 different algorithms are needed, depending on particular field
- Testing & development !
- Plan for combining subbands in calibration step

- Take home message: Focus needed on commissioning the interface between the pipeline and the skymodel DBs

- We have the data in hand to perform testing - “blind” calibration of existing data can be done to test these additions

Suggestions

- Some commissioners should start working with the script that Bart has produced - sanity check of the output!
  - WWUD?

Suggestions

- Some commissioners should start working with the script that Bart has produced - sanity check of the output!
  - WWUD?
  - Additionally, take advantage of the data and skymodels already on hand !

Suggestions

- Some commissioners should start working with the script that Bart has produced - sanity check of the output!
  - WWUD?
  - Additionally, take advantage of the data and skymodels already on hand !
- Inter-KSP work (i.e. TKP & SKSP) on
  - Interfacing the skymodel database progress with the calibration commissioning
  - Defining the major cycle algorithm and implementing in pipeline

Suggestions

- Some commissioners should start working with the script that Bart has produced - sanity check of the output!
  - WWUD?
  - Additionally, take advantage of the data and skymodels already on hand !
- Inter-KSP work (i.e. TKP & SKSP) on
  - Interfacing the skymodel database progress with the calibration commissioning
  - Defining the major cycle algorithm and implementing in pipeline
- Making the pipeline function in an automatic fashion is leading to MSSS
  - Extra focus in that direction can be achieved with a busy week this summer, say a "MSSS-preparation busy week" ? -- Clearly defined task list targeted toward enabling the survey