Bonn Correlator Status

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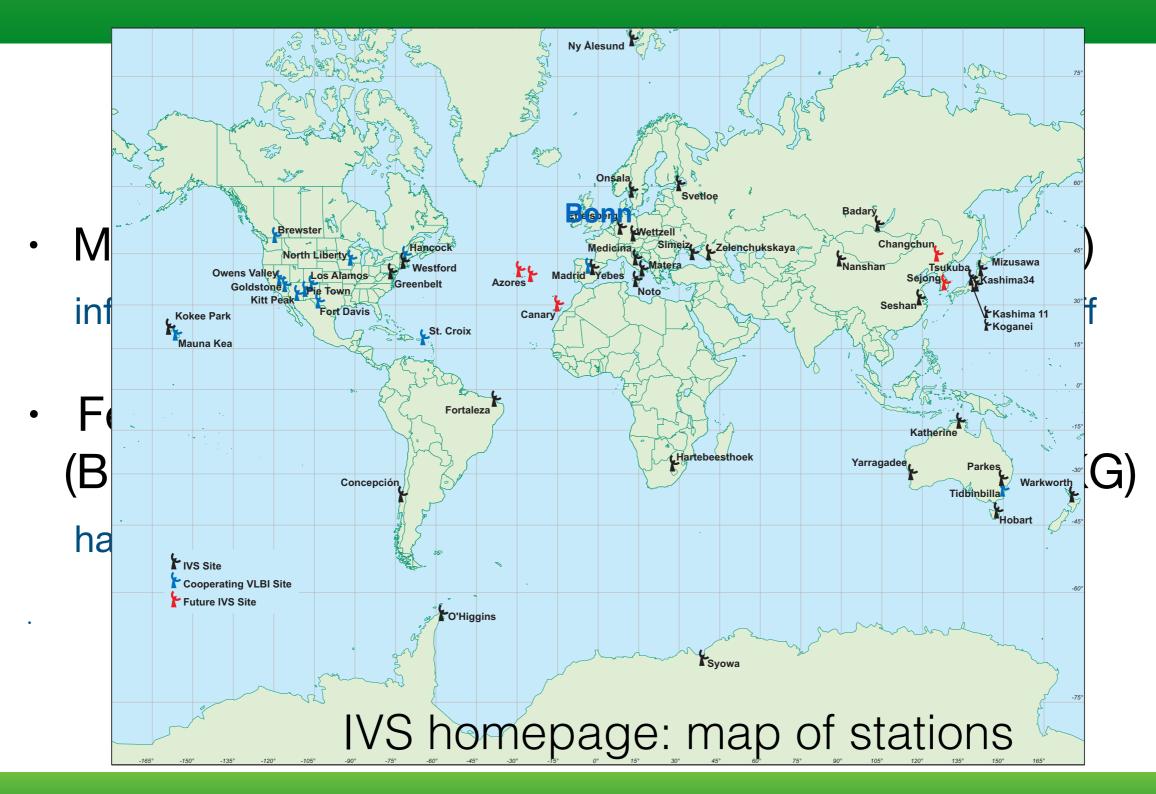Helge Rottmann[2] and Jan Wagner[2]

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2. Max-Planck-Institut für Radioastronomie (MPIfR)
3. Bundesamt für Kartographie und Geodäsie (BKG)

General Information

- Max Planck Institute for Radio Astronomy (MPIfR)

  infrastructure (host institute) + hardware + connectivity + staff

- Federal Agency for Cartography and Geodesy (Bundesamt für Kartographie und Geodäsie, BKG)

  hardware + *outsourced* staff (1.6 FTE) via Reichert GmbH

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General Information

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IVS homepage: map of stations

Correlator Capabilities

- High Performance Computing (HPC) Cluster

- 68 nodes with 20 compute cores each, for a total of 1360 cores

- Three head nodes

- 2.8 PB disk space in RAID units and combined in a BeeGFS parallel cluster file system

- 14 Mark5 playback units

- 11 Mark6 playback units each with four and some with six bays

- 10 Gbps Internet connection for data transfer

Regular Sessions in Bonn

- IVS S/X Sessions

  - INT3 (1 hour, weekly on Monday): 34 sessions in 2022, 37 sessions in 2023
    3-5 stations

  - R1 (24 hours, weekly): 52 sessions in 2022, 52 sessions in 2023
    10-15 stations   **Mixed-mode**

  - T2 (24 hours, bimonthly): 7 sessions in 2022, 7 sessions in 2023
    15-20 stations

  - OHIG (24 hours, bimonthly): 6 sessions in 2022, 6 sessions in 2023
    5-7 stations

- IVS VGOS (24 hours): 10 sessions in 2022, 10 sessions in 2023
  8-11 stations

DiFX-2.5.4/2.5.5

- Each correlator has own local patches and different versions of DiFX to correlate and difx2mark4.

- In August 2021, Jan Wagner gathered necessary patches and backported certain features from DiFX-2.5 and DiFX-2.6. and together with Haystack-provided HOPS 3.22, released DiFX-2.5.4 to the DiFX community. (HOPS 3.24)

DiFX 2.6

- DiFX 2.6.3 used for IVS R1 mixed-modes

- Batch job submission (SLURM) via 'difxslurm' for better sharing of cluster [with other users <EHT/GMVA/pulsar/simulation/...>].

Testing DiFX 2.8

- Testing DiFX 2.8.0: bug auto-correlation not produced > Fixed

- Testing DiFX 2.8.1: Too High SNR in mixed-baseline Fix needed

Multi-datastream Correlation

- Recorded bands are spread across several files; DiFX mulit-datastream correlation.

- Previously VGOS data should be vmux-ed and this occupied the disk space doubly and needed extra time/work.

- For mixed-mode, Hobart, Katherine and Ishioka observe with multi-datastream

- For VGOS, Onsala Oe/Ow, Ishioka, Hobart and Ny Alesund North observe with multi-datastream

- Correlatable under DiFX 2.5.5 and 2.6.3 using multi-datastream configuration

Upgraded Internet Connection

- Previous: 2 × 1 Gbps NREN (DFN) links (BONN, RZBONN Servers)

- In October 2021, we upgraded to a commercial 10 Gbps link (NetCologne) for e-VLBI and replaced "BONN" Server. "RZBONN" is still working.

- Transfer protocols: jive5ab/m5copy, e-transfer (etc/etd)

VGOS Correlation (VO3124)

- 10 stations (7 stations e-transfer, 3 stations Mark6 modules)

   Gs, Hb, Is, K2, Nn, Oe, Ow, Wf, Ws, Yj

- Data arrived in around two weeks

- Problem in data (Quick check is important)

- Correlation itself took 60 hours

- Observation to Correlation report in 30 days! :-)

Summary

- Correlation of IVS S/X sessions/ VGOS sessions (~110 sessions/year)

- Internet connection upgraded to 10 Gbps

- Due to low disk space, still Mark6 modules used for VGOS sessions. While EHT Correlation is running, limited to use Mark6 units.

- Many Problems during observations can be solved in correlation, even after the correlation.

Thank you for your attention!

Questions?