EVN Performance and Reliability

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[on behalf of EVN Support Scientists]

EVN TOG *zoom* meeting, 2021 April 29

NME Results & Feedback

2021 session 1: Summary

Effelsberg: Strong spikes at the edge of BBC chan 2 and 10 in N21C1.

Kunming, Tianma, Urumqi: *Could not participate due to ongoing national tasks.*

KVN: Kt could not participate in F21K1 because of an H-maser problem.

Medicina: Strong ripples observed across the bandpass in N21X1 (as in previous sessions at this band)

MERLIN: FlexBuff related issues (C- and K-band)

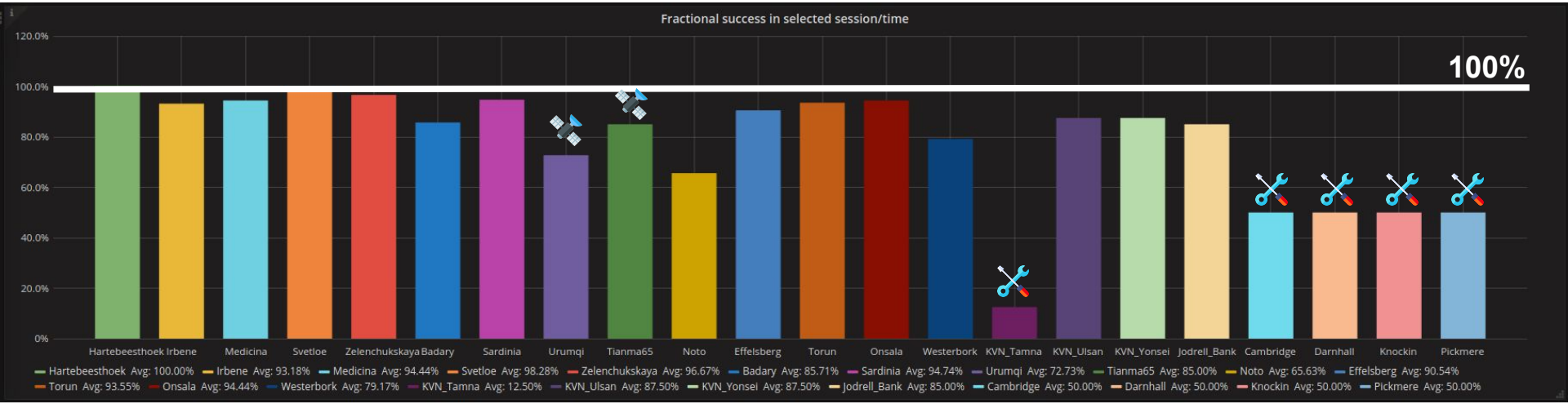
Noto: No fringes in N21L1 due to a technical problem at the telescope side.

Westerbork: No fringes in N21X1 for unclear reasons (high Tsys suggests issue in the receiver).

Yebes: Could not participate in the session due to severe damage on the elevation shutter of the telescope after a snow storms.

Summary: June 2020 - November 2020

- **KVN: Kt** had a problem with their H-maser.
- **MERLIN:** Data delivery issues during NMEs.
- **T6, Ur, Km:** Could not participate due to ongoing national tasks



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Amplitude calibration

Submission of ANTAB files

- **KVAZAR:** No antab files for Session I 2021. **But fast response!**
- **Jb:** severe RFI at L-band prevent the TPI measurements

- **Tianma:** Doesn't send ANTAB files in several experiments by default
- **Kunming:** No antab files (system does not support it). **Feedback on how the implementation of Tsys measurements is going?**
- **Urumqi:** Antab files from the telescope have long been unavailable due to a problem with the script that generates them. A few sent during last experiments but most of the times without reliable values.

- **Effelsberg:** Corrected a bug that was missing the GAIN header in experiments with the continuous Tsys calibration OFF.
- **Badary:** Significantly different gain scale for LCP and RCP in 2020 Session 3 (which was not real from the data). Fixed in 2021 Session 1?

Submission of ANTAB files

	2021-1	E-EVN
KVAZAR	?	
T6	14	-
Jb	14	1
Ur	14	-
Ef	5	1
Hh	5	1
Ir	1	1
Mc	1	1
Tr		-

Delay in days
between experiment and
ANTAB file upload

The number represents
the most delayed file

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Submission of ANTAB files: e-EVN

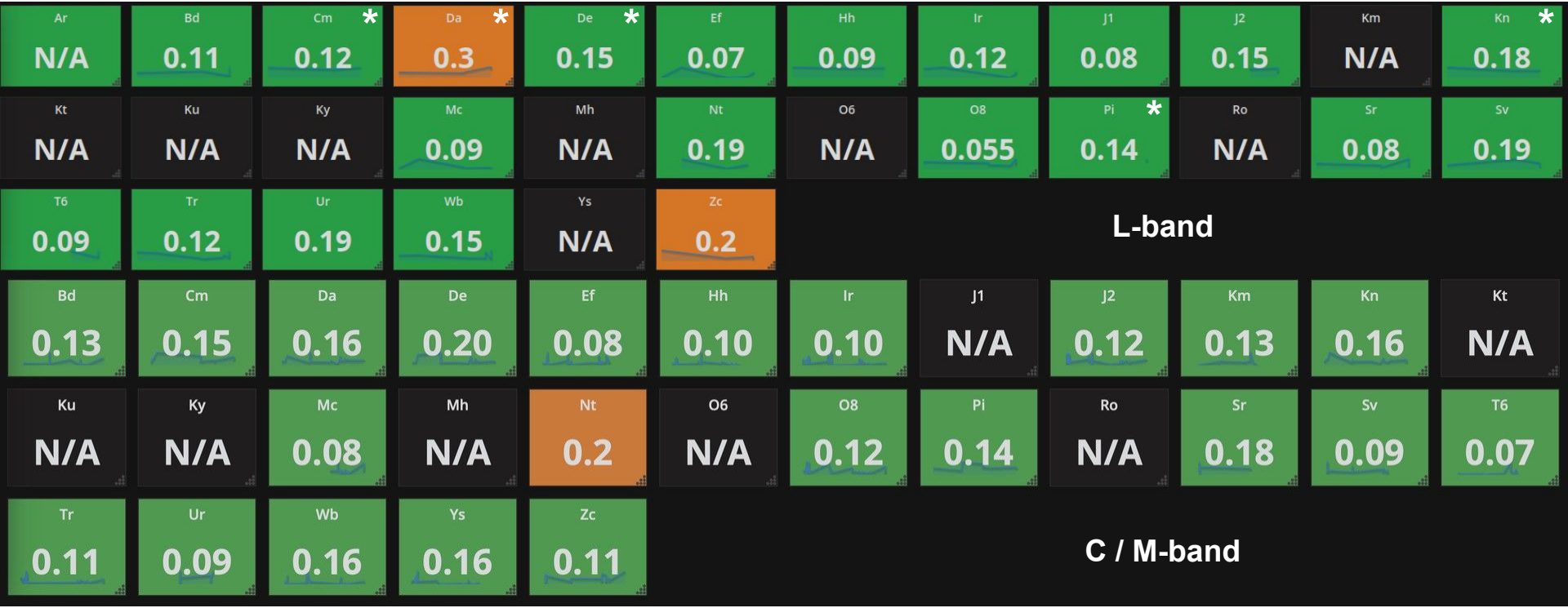
Experiments from e-EVN observations are typically processed within 1-2 days.

! Largest delay is often due to waiting times for ANTAB files !

*Is it feasible to send the ANTAB files **within 24-48 hours**?*

Then experiments would likely be distributed to PI **within 48/72 hours**.
In case of ToOs it may make a difference.

Median absolute error in gain calibration [2021 s1]



*__eMERLIN:__ the gain calibration is tricky: a lot of RFI, no Tsys values recorded, and limited bandwidth (so fewer subbands to draft a baseline amplitude)

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Median absolute error in gain calibration [2021 s1]

***K-band:** we still have unreliable amplitudes; an open issue with the opacity corrections done/not done in different antennas

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Median absolute error in gain calibration

Working on improving station feedback plots in Grafana from JIVE

To be done in the coming months:

- Absolute corrections (instead of the relative ones).

- Account for corrections performed by Support Scientists (currently done hidden behind scenes).

  The provided corrections are the ones from the EVN Pipeline results, where gains have already been optimized at JIVE compared to the original ANTAB files (either by introducing gain correcting factors or skipping subbands/polarizations with meaningless values).

e-MERLIN in the EVN

Amplitude correction problems:

- no Tsys measurements - poorer calibration
- reduced bandwidth - less sensitive
- strong, variable (internal?) RFI - further loss of sensitivity
- normalization by autocorrelation, done by SFXC, may cause additional problems in this case

To meet user expectations (substantial sensitivity of the combined array on a few tens mas to arcsec angular scales) we must address these issues.

Improvements achieved!

- **We keep operations running during the COVID-19 pandemic!**
  Thank you everyone for your efforts on that!

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Requests / Suggestions

- No antab files from **Urumqi** and **Kunming**: system implementations?
- Upload the ANTAB files… Do not wait for our email!

Kind requests from Support Scientists

- ❏ Join chat during NMEs and e-EVN runs
- ❏ Station feedback (and detailed)! (use of “cause of the problems” options?)
- ❏ Upload log files to vlbeer (every time less files…)
- ❏ Upload ANTAB files to vlbeer after the observations (and check them beforehand, inform us about issues)
- ❏ Update your local scripts (e.g. antabfs.py)
- ❏ Be responsive to emails and provide feedback!