

**Time & location:**

1<sup>st</sup> part: Thursday, March 03, 2022, 1000 – 1220 CET

2<sup>nd</sup> part: Tuesday, March 15, 2022, 1300 – 1530 CET

**MINUTES****1. Opening (Söhne)****2. Approval of minutes of 87<sup>th</sup> GB meeting (Kollo, Söhne)**

*No comments during the meeting but offline comments to KK and WS still welcome.*

**3. Review of Action Items from previous GB meetings (Söhne, Kollo)**

*WS displays the sheet with the action items and the status of each of them.*

**4. EUREF Symposium 2022 (Đapo, Marjanović – invited guests)**

*MM presents the decision of the local organizers. First, physical meeting was planned, but the situation in Europe and also the pandemic led to the decision to held a digital meeting. The GB agrees. URL is already existing: <https://euref2022.eu>.*

**Action Item to WS, KK: organize updating the international calendars (digital, web page) concerning the 2022 EUREF symposium**

**Action Item to AD, MM: write EUREF mail on the announcement of the 2022 EUREF symposium**

**5. Validation of GKU GNSS multi-year campaign (Ferianc, Droscak – invited guests)**

*MF gives a detailed presentation on the main features and results of the GKU GNSS multi-year campaign.*

*Discussion: AC agrees with the report and points to the missing detail commented by EB prior to the meeting, which may lead to an update of the respective guidelines. NavIC should be added to the tracked constellations, in particular with the Trimble Alloy receivers. ZA: be careful with the interpretation of the vertical velocities on slides 17 and 18, in particular using the transformation between IGB14 and ETRS2000. MF points to the legislation which makes any change difficult. JL: asks for the difference between comparisons with JZ's and EPN densification solutions, in particular for station BBYS. Should be no differences. Proposes a dedicated meeting, either separately or directly following this meeting. JZ: follow the naming conventions of the IGS in order to make combinations and comparisons easier. Regular update would be much appreciated by EPND. CB: asks for the ETRS2000 coordinates, in particular the frame extension, e.g. (R05), (R08) or (R14). ZA agrees to remove the extensions, EB recommends to leave it to the countries. JL prefers to keep this information but the frame should be recognized.*

*Continuation of the discussion in the proposed dedicated meeting after the official end of part 1 of the meeting (CB, JL, JZ, TL, ML, KK, WS; BD, MF, MPa) with some proposals for refinement.*

**6. Status of ITRF2020 (Altamimi)**

*ZA gives an overview on the status of the (preliminary) ITRF2020. ITRF2020P was already published with some feedback. Final not yet published, waiting for the IVS feedback. Seasonal signals are new and are available with respect to the CM (Center of Mass) and/or the CF (Center of Figure). 21 years of IGS observations included, 3106 discontinuities which may be visible also in IGS20. Still gaps, e.g. in Greenland. PSD for approx. 120 earthquakes. Two new Logarithmic terms. Stations in Eurasia: REYK, SPAN in Greece, YSSK in Russia. CN (Center of Network) is an approximation of the CF. What to use in Europe / in the EPN? Residual variations remain in Europe due to the Center of Motion.*

*Discussion on the scale: differences between SLR and VLBI scale. Clear drift in VLBI scale from ~2014 onwards. AC asks for the scale, in particular of VLBI, and why it is in mm and not in*

*ppb. Scale comes from SLR. ZA mentions that the IGS people see the VLBI scale as the one. Discussion on the frame (CM vs. CF): ZA would prefer the CF frame. But some users, e.g. from satellite altimetry, prefer CM.*

## 7. EUREF

### a. Handling of Russia, Belarus, GLONASS in EUREF

*CB explains some options. Stopping sharing data from Russian and Belarussian stations. Stop tracking won't be visible. ML sees the risk of problems if we go separately, not coordinated. After stopping GLONASS and resuming, it might be seen as accepted "new normal". MP: IAG is preparing a statement today. Impact to Network RTK without GLONASS orbits may be large. EB: we stopped several activities with GLONASS, also from the SLR community. AA: stopping monitoring and showing GLONASS results. EB: mentions the signals of all GNSS to be disturbed by Russia in the Ukraine and beyond. Use LORAN-C instead. CV mentions the AGU statement not blaming anyone. EUREF could make a statement as EUREF mail. AC sees the difficulty to do something separately. We should wait for the IAG statement before doing something.*

### b. Memoranda of Understanding (Söhne, Lidberg, Pacione)

#### i. EUREF-EPOS MoU

*The EUREF-EPOS MoU was already discussed by EPOS TCS "GNSS Data and Products" Executive Board (late February) and by the Coordination Board (on March 04). The draft MoU has been sent back to the EUREF chair by the TCS chair with minor corrections. Next step would be to contact EPOS ERIC.*

#### ii. EUREF-BEV MoU

*The MoU between EUREF and BEV has been accepted by BEV's lawyer. Signature from both sides as next step, possibly via email exchange.*

#### iii. EUREF-EUMETNET MoU

*RP mentions the recent E-GVAP meeting on March 10+11. Improvements and possible new products were discussed, in particular towards shorter update cycles and real-time. The EUREF-EUMETNET MoU dates from 2005 and should be reviewed, if extension was necessary.*

**Action Item to EB, RP and WS: review the MoU between EUREF and EUMETNET and propose updates if necessary**

### c. Exchange of EUREF Documents and Information (Söhne, Völksen)

*CV contacted the EUREF webmaster towards the preparation of a dedicated section on the EUREF web page for the EUREF GB. H. Ribero proposes a usr:pwd protected area. She can provide some solutions for archiving, needs to finalise the technical details (number of users, user rights, etc). WS explains the plan from BKG to install an external BKG wiki for external projects and cooperation. It is similar to the internal BKG wiki but fully independent. EUREF GB and WG on "European Height Reference Surface" are accepted candidates. Specification of rights (read, write, etc) for each page possible. CV will clarify details of EUREF web page with HR. WS will investigate in more detail the handling of the wiki.*

## 8. EPN

### a. Update of guidelines (Bruyninx, Söhne, Legrand)

*Revision of the comments to the station guidelines by CB. RT time stream made on same condition as hourly/daily RINEX files. Different sources for RINEX – native or from stream.*

*Update of data centre guidelines necessary for synchronisation between data centres. Some log information may be required in order to understand what happens with incoming RINEX files.*

*Generation and archiving of the so-called high-rate RINEX files, usually with 1 second sampling rate, to be provided in both guidelines.*

**Action Item to CB: for the station guidelines, propose wording for the concatenation of hourly data files and clarify the order of generation of 1 Hz RINEX files**

*Guidelines of densifications – some small changes concerning the official ETRS89 coordinates in sections 6.1, 6.2 and 4.4.*

**Action Item to JL: update the guidelines for EPN Densification and publish online**

**b. Application of GNSS ground antenna calibrations (AA, RD, JL, TL, WS, CV)**

*Meeting to discuss GNSS antenna calibration was held, JL gives overview. Individual calibrations vs type mean calibrations -> suggestion is to use IGS antenna type mean calibrations. ML: is it an issue if there is antennas which have no good calibration values? CV: there is no problem with old calibrated antennas, IGS antenna group have contacted to Geo++ to have more antenna calibration values. Any antenna what have been used within EPN, we receive antenna calibration values.*

**Action Item to AA, RD, JL, TL, WS, CV: communicate the results of the discussion of the groups and the conclusions of the GB meeting to the EPN ACs**

**c. EPN-REPRO3 (Völksen)**

*CV gives an overview. 1st meeting 22 Feb 2022. EPN-Repro 3 should be consistent with the future operational solutions computed in IGS20. Each EPN site should be computed by at least three ACs. Reprocessed products are available of the different IGS AC are available, EACH EPN AC should choose the reprocessed products that offer the highest consistency with their software. EPN-Repro requires MF (multi frequency) antenna calibrations, should match operational EPN analysis, suggestion to use only type-mean calibrations. IGS switch to IGS20 not before August 2022, EPN repro3 is unlikely to begin sooner than this date.*

*Discussion: AA: we could go forward with benchmark test (using IGS14). JL: is there a plan to redistribute station to optimise backbone network? CV: Call who is ready to have additional station and share this info with Juliette. BM: in principal there is no problem to analyse all 116+20 stations. CB: if we change our network for repro, then we have to change it back for operational. CV: Benchmark test goal – to avoid inconsistency between operational and repro data processing, some overlap. TL: some stations are occasionally computed, will they be continued? -> CB: never stopped but they have not been submitted to EUREF.*

**9. Height and Gravity**

*JS gives an overview on the activities. (1) “D-A-CH geoid project”; (2) FAMOS/BSCD2000 geoid in the Baltic Sea; (3) New CRS-EU database structure confirming ISO19111; (4) questionnaire about national height reference grids/Call for GNSS-levelling, deadline 30<sup>th</sup> of April 2022, candidates for WG approved (M. Bilker-Koivula (FGI), R. Barzaghi (polimi), A. Ellmann and S. Varbla (TalTech). Summary of questionnaire will be presented in EUREF2022, WG website is under construction.*

## 10. AOB

### a. UN-GGIM:Europe (Lidberg)

*ML states that it seems that UN-GGIM:Europe is getting more involved and interested in geodesy (which is positive). And since EUREF has been active since more than 30 years and have a lot of cooperation between the counties already in place, some contacts between EUREF and UN-GGIM:Europe seem reasonable.*

**AI to ML: establish the contact to UN-GGIM:Europe and explain EUREF's role as a first step for possible further cooperation**

### b. ISO geodetic registry (Lidberg)

*The ISO Geodetic registry was presented to the GB at the GB87 meeting in November. ML and the coordinator of the ISO GR Control Body, Michael Cramer, have prepared a draft for a letter on including national realisations of ETRS89 to be sent to the NMAs. Some further improvements of the letter are needed to include information on the CRS-EU. MS would like to be involved in a discussion on the CRS-EU.*

**AI to ML: complete the letter to the NMAs, distribute among the GB members for comments and send the letter to the NMAs**

### c. Next GB meeting(s) (Kollo, Söhne)

*KK will set up a doodle poll for the meeting, which will take place digital and in two parts prior to the symposium.*

## PARTICIPANTS

Z. Altamimi  
 E. Brockmann  
 C. Bruyninx  
 A. Caporali  
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