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# Key issues, recommendations, action items

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# Key issues

- GLONASS bias calibration
  - biases relevant to GNSS receiver interoperability
    - must be interpreted as biases related to “receiver clock offset between phases and pseudoranges” as addressed by Sleewaegen (Septentrio) and Schaer (CODE)
      - DCPB: differential code-phase (receiver) bias as called by Takac and Alves (Leica/NovAtel)
    - (relative) calibration feasible
      - Wanninger (TU Dresden)
      - Schaer (CODE) → operationally done in CODE’s IGS analysis for all AR-involved GNSS receiver types
    - RTCM community has a serious interest in finding asap a consensus for this “interoperability problem/issue”
  - biases revealing time differences between GPS and GLONASS that may vary with receiver model and receiver firmware
- Knowledge of (absolute) time difference between GPS and GLONASS



## Key issues (cont.)

- Integer clocks (and “integer PPP”)
- L1/L2/L5 inconsistency (or line bias variation) in GPS
- Consistency among all DCB/bias products
- Pilot data biases will become a key issue
- BOC/MBOC tracking inconsistency



# Recommendations

- IGS to agree to MSM standards?
  - High-precision MSM
- “Clarified” definition of datum for GLONASS biases as retrieved by IGS ACs (described in ACN)
- Knowledge of (absolute) time difference between GPS and GLONASS is of great interest
- GNSS receiver manufacturers should look into the claims of Septentrio regarding the source of the DCPB (differential code-phase bias)
  - If this can be confirmed then these manufacturers should conduct interoperability tests and distribute the results to encourage others to also participate
  - Manufacturers and RTCM members should consider the proposal to adopt an interoperable MSM format



## Recommendations (cont.)

- The IGS (BCWG, or M-GEX) should define a minimum set of observation/observable codes that IGS-approved receivers must support (regarding Galileo and modernized GPS)
- Create a list of all provided GNSS biases (with precise definition/equation) → to be included in GNSS bias SINEX format description
- Detect discontinuities in DCBs
- Extend (Bernese) DCB format to include validity interval for each bias
- Investigate the possibility to convert DCBs from relative to absolute system of bias corrections



## Recommendations (cont.)

- IGS-BCWG mailing list is promoted to be used for discussion and information exchange
  - subscription to this particular IGS mailing list necessary
  - message archive just accessible by list members
  - moderator of this mailing list: S. Schaer



# Action items

- Write short summary (summarizing results and main conclusions of the biasws2012)
- Make biasws2012 oral presentations online available (in pdf form), linked to IGS website (igs.org)
- IGS ACs providing GLONASS clock corrections must provide their GLONASS bias values in bias-SINEX
- “Standardized” definition of datum for GLONASS biases as retrieved by IGS ACs (not a must, but nice to have)
- Bias-SINEX:
  - Collect ideas and approve them within the IGS-BCWG for an update of the bias-SINEX (version 0.01+0.99?) → we should have a look at others existing bias formats
- Member list of IGS Bias and Calibration WG (BCWG) has to be reviewed (by March 2012)



## Action items (cont.)

- Follow-up meeting concerning *IGS Workshop on GNSS Biases* (in 2014) to keep track of progress, in particular with respect to new **Galileo** and GPS signals
  - Who is willing to host/organize the workshop? Where?