BIAS Team

Solar Orbiter / RPW

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ROC/BIAS Management

- Andris Vaivads (IRF) – Lead Co-I (overall responsibility)
- Erik Johansson (IRF) – Lead software engineer
- Yuri Khotyaintsev (IRF) – Lead archiving scientist

SUPPORT:

- Daniel Graham (IRF) – Consultant, AC calibration
- Anders Eriksson (IRF) – Consultant, DC calibration
- Thomas Nilsson (IRF) – SPIS simulations
- Thomas Karlsson (KTH) – KTH coordination

- Footnote: Lennart Åhlén (IRF) – Hardware engineer (BIAS design, testing) – Retired in ~April 2017

BIAS Calibrations Software (BICAS)

- Software version control (internal): git
- Implementation:
  - MATLAB 2016a (+ NASA CDF patch)
  - Internally uses official datasets (CDFs) plus "internal datasets", all related through a web of modular one-way dependencies. Output datasets are derived recursively, indirectly from the input datasets. Design should make the dataset processing flexible w.r.t. e.g. multiple dataset versions, changing dataset relationships.
- Intended to be extended to be used on both pipelines: ROC-SGSE (ground calibration; current impl.), and RODP (mission)

Current status, issues

- RCS User Manual (RUM): draft submitted (2017-05-05)
- Software Requirements Specification (SRS): 1st ver. submitted (2018-01-29)
- BIAS calibration table (RCT)
  - Skeleton: submitted
    - Transfer functions described by analytical expression with coefficients (2x8 per TF) stored in RCT.
    - Temperature dependence handled by having all coefficients be time-dependent (zVars have on time-dimension; two Epoch-like zVars for different time-resolutions)
  - First version with calibration values: submitted (2018-03-21; ROC-SGSE_CAL_RCT-BIAS_V201803211625.cdf)

- ? BIAS needs RCTs from TDS+LFR:
  - LFR: There is one such RCT? (ROC-SGSE_CAL_RCT-LFR-BIAS_V01.cdf ?)
  - TDS: There is no such RCT?

Current status, issues

- BICAS (the BIAS RCS) – Minor update since RPW #20:
  - ~ICD compliant (not latest ICD; if ignoring CDF contents)
  - Does read, process, and produce subset of datasets. Supported output CDFs “decent”.
    - Handles LFR WF datasets; incomplete implementation for TDS-LFM WF.
    - Simplistic calibration: multiplication (no transfer functions, no offsets)
    - Processes dataset levels according to old scheme L2R → L2S (not L1R→L2S)
    - No sweeps and bias currents (awaiting design decisions with ROC; only RODP pipeline anyway)
  - Consistent system for settings; config file overrides defaults
  - (+Internal MATLAB ”library” for exploring/working with BIAS standalone calibration data (non-standard data format): BSACT_utils/)
  - (+Internal MATLAB ”tool” for filling BIAS RCT CDF skeleton with calibration values hardcoded in MATLAB code (few values))
  - Unfinished version commited/uploaded to ROC (unfinished) (2018-01-29)

BIAS Datasets (excl. RCT) – No updates since RPW #20 (?)

- BICAS **input** datasets:
  - Can read – All LFR, V01/V02
    - ROC-SGSE_L2R_RPW-LFR-SBM1-CWF
    - ROC-SGSE_L2R_RPW-LFR-SBM2-CWF
    - ROC-SGSE_L2R_RPW-LFR-SURV-CWF
    - ROC-SGSE_L2R_RPW-LFR-SURV-SWF
    - ROC-SGSE_HK_RPW-BIA
  - Can read (processing incomplete)
    - ROC-SGSE_L2R_RPW-TDS-LFM-RSWF
    - ROC-SGSE_L2R_RPW-TDS-LFM-CWF
  - Will also eventually need to read more datasets (RODP pipeline). Awaiting design decisions.
    - SOLO_L1_RPW-BIA-SWEEP (Sweeps)
    - Bias currents
- BICAS **output** datasets:
  - Can output; skeletons are well defined (V02)
    - ROC-SGSE_L2S_RPW-LFR-SBM1-CWF-E
    - ROC-SGSE_L2S_RPW-LFR-SBM2-CWF-E
    - ROC-SGSE_L2S_RPW-LFR-SURV-CWF-E
    - ROC-SGSE_L2S_RPW-LFR-SURV-SWF-E
  - Partially implemented; Skeletons are well defined
    - ROC-SGSE_L2S_RPW-TDS-LFM-RSWF-E
    - ROC-SGSE_L2S_RPW-TDS-LFM-CWF-E
  - Will also eventually need to read more datasets (RODP pipeline). Awaiting design decisions.
    - Sweeps
- (Preliminary L3 datasets (no L4); no impl.)
  - E x B drift
  - True satellite potential
  - 3D electric field (E dot B = 0)