# TDS update

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TDS calibration status

- Analysis of calibration data largely complete

- Calibration functions for ROC software prepared

  - TDS HF and LF transfer functions for SCM data now available in CDF
  - LFM mode transfer function for bias channels also available
  - HF mode electric field snapshots: TDS team will be in charge of producing calibrated L2 data

- Calibration of TDS HF snapshots: two transfer functions need to be applied to get L2 data:

  - TDS transfer function
  - HF preamp transfer function (received from LESIA)

- Antenna effective lengths and directions:

  - Between 1 kHz and 200 kHz, a constant matrix will probably provide good approximation. This is assumed to be provided by THR team. Not applied for the moment.
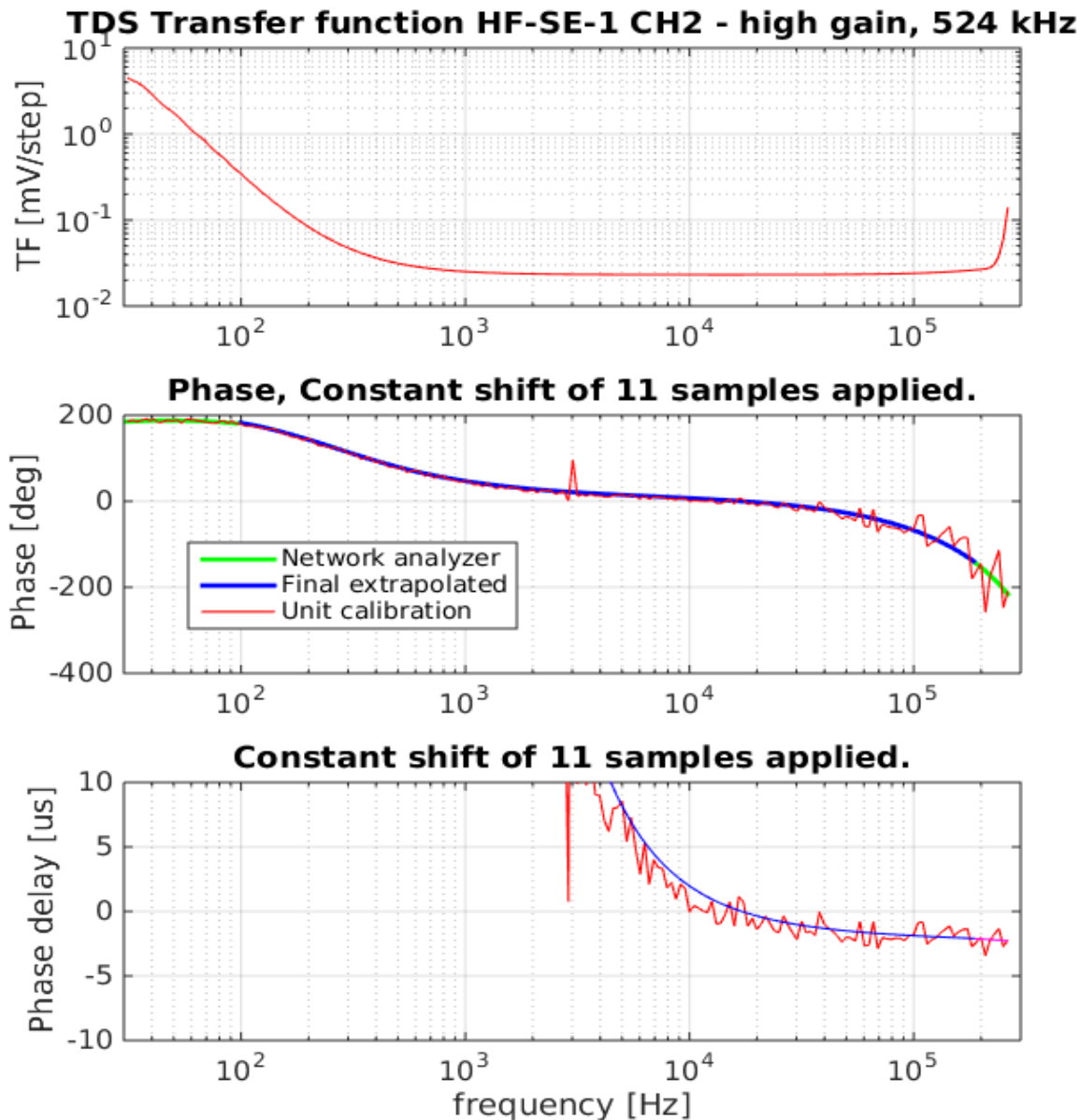
TDS HF snapshot calibration
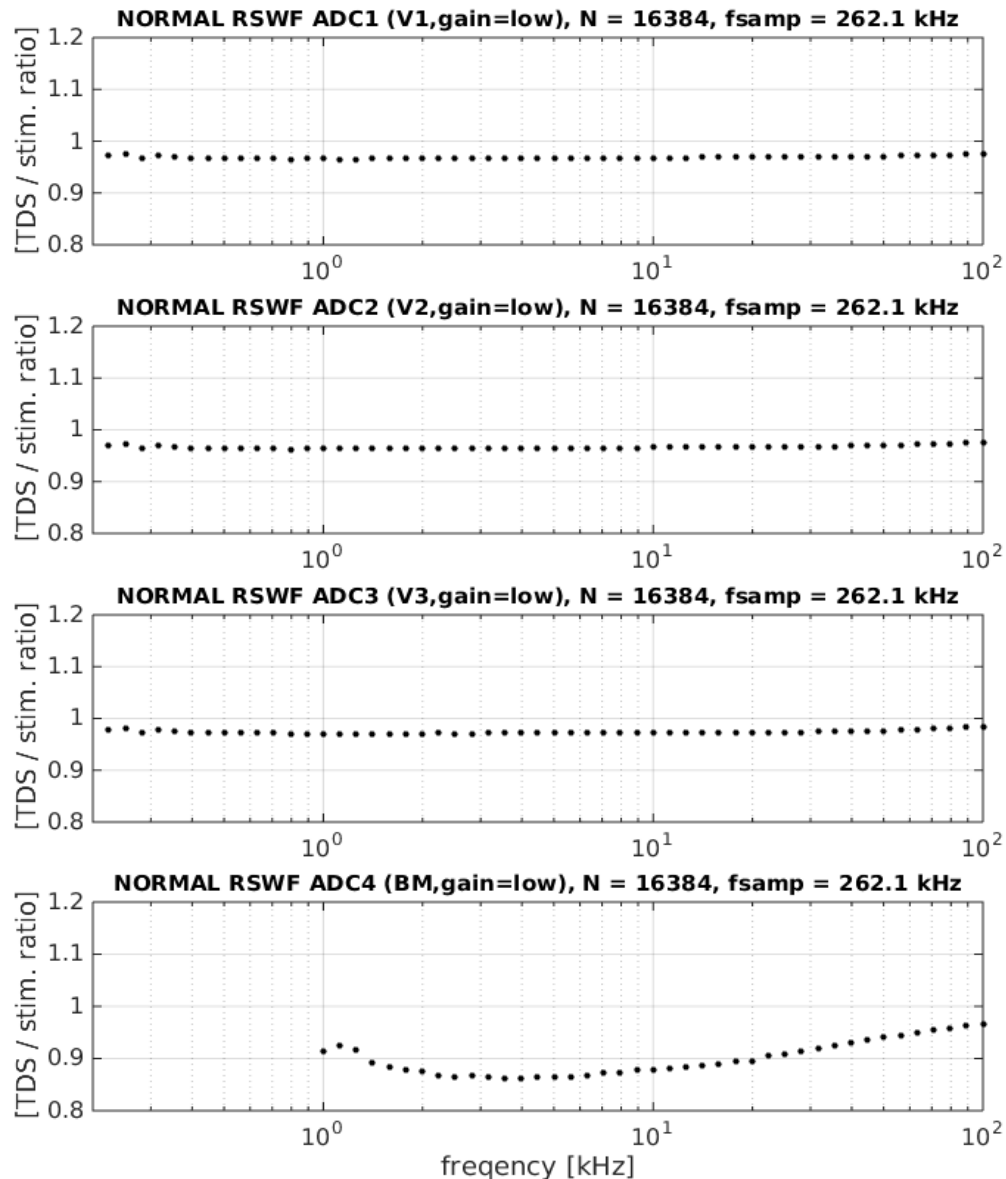
RPW system calibration data:

- Ratio between TDS measurement and stimuli plotted.

- TDS, SCM and preamp transfer functions applied.

- Good match for V_HF channels.

- L1 –> L2 transfer function seems valid.

TDS phase response

TDS Transfer function HF-SE-1 CH2 - high gain, 524 kHz

Phase, Constant shift of 11 samples applied.

Constant shift of 11 samples applied.

- TDS complex transfer function derived as a combination of:
  - Unit calibration with EGSE
  - Unit calibration with network analyzer.

- Final transfer function obtained and provided in ROC compatible CDF format (used primarily by SCM team).

TDS calibration scheme

- TDS Calba software converts **L1** files to **L1R** and **L2**

- **L1 → L1R**

  → NORMAL/BURST/SBMx/LFM Waveform snapshots B-field
    (L1R → L2 provided by SCM software)

  → LFM Waveform snapshots E-field
    (L1R → L2 provided by BIAS software)

  → LFM continuous waveform E/B-field
    (L1R → L2 provided by BIAS/SCM software)

- **L1 → L2** (fully under TDS team responsibility):

  → NORMAL/BURST/SBMx waveform snapshots E-field

  → LFM spectral matrices

  → Histograms, statistical products, maximum amplitude (MAMP)

L2 data processing

- L2 needs to be in physical coordinates

  - B in nT or nT^2/Hz
  - E in V/m or V^2/Hz

- The respective transfer functions are required to perform this step

  - Expected to be provided in CDF format by SCM / THR teams.

- Electric field is more tricky. Proposal:

  - For L2 in TDS (in particular for the snapshots), we will apply a constant calibration matrix, implementing the antenna effective lengths and directions.

  - Improved E-calibration, taking into account atenna-plasma interactions etc. will be an L3 product.

TDS funding status

- Current PRODEX contract until October 2018
  - Zero cost extension to end of 2019
  - Enough travel budget remains for 2019. Not much else.
- New contract
  - Czech Grant Agency proposal will be submitted in April.
  - We will attempt submit a proposal to PRODEX to gain some technical support for operations, result uncertain.
- Either way, work will continue.

TDS calibration software status

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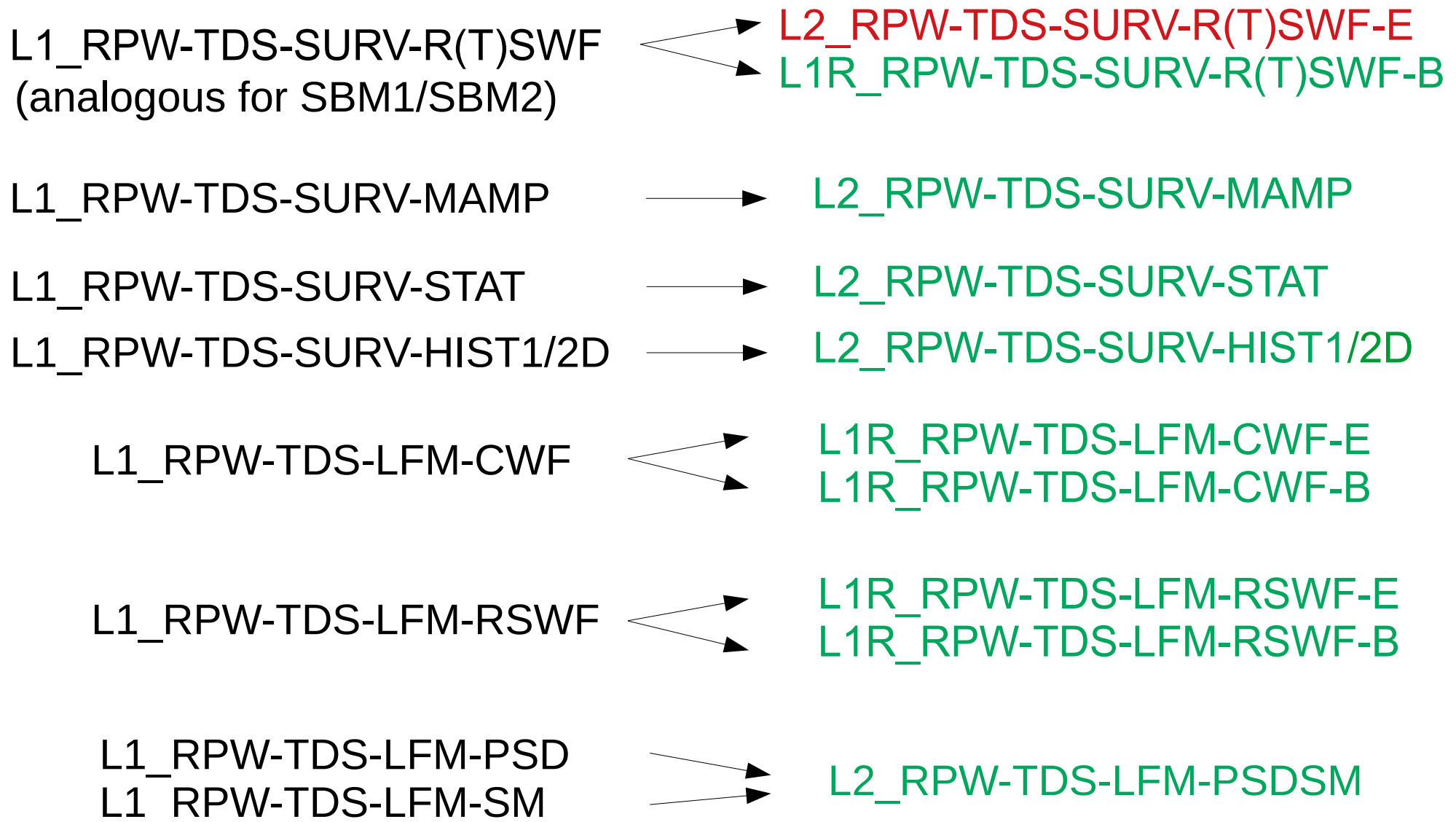*Institute of Atmospheric Physics, Prague, Czech Republic*

TDS calibration software

- **TDS_CALBA software v0.8.2 committed in ROC-Git**
  - Written in IDL/bash
  - Designed to be RTGS/RODP pipeline compliant
  - Compatible with the latest ROC-SGSE Skeleton format V03
  - Full parsing of TDS metadata
  - User manual (SUM) Iss1Rev0 - delivered
  - Software Requirements Specification Iss1Rev0 - delivered
  - Documentation – to be delivered with the first pipeline release

CDF data product scheme

Data product logic:

L1_RPW-TDS-SURV-R(T)SWF
(analogous for SBM1/SBM2) → L2_RPW-TDS-SURV-R(T)SWF-E
→ L1R_RPW-TDS-SURV-R(T)SWF-B

L1_RPW-TDS-SURV-MAMP → L2_RPW-TDS-SURV-MAMP

L1_RPW-TDS-SURV-STAT → L2_RPW-TDS-SURV-STAT

L1_RPW-TDS-SURV-HIST1/2D → L2_RPW-TDS-SURV-HIST1/2D

L1_RPW-TDS-LFM-CWF → L1R_RPW-TDS-LFM-CWF-E
L1R_RPW-TDS-LFM-CWF-B

L1_RPW-TDS-LFM-RSWF → L1R_RPW-TDS-LFM-RSWF-E
L1R_RPW-TDS-LFM-RSWF-B

L1_RPW-TDS-LFM-PSD
L1_RPW-TDS-LFM-SM → L2_RPW-TDS-LFM-PSDSM

CDF Master files status

- ROC-SGSE Skeletons for L1R/L2 V03 finalized
  - Committed in ROC-Git
- RODP Skeletons for L1R/L2 V01 finalized
  - Committed in ROC-Git
- Skeletons and data files for transfer functions provided to SCM and BIAS teams
  - Committed in ROC-Git