



# **SCM ROC Calibration Software**

## **SCML2RL2S**

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# Plan



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Its purpose is to produce the calibrated SCM waveform data

- initially from L2R waveforms,
- In the actual version, from L1 or L2R,
- In the future from L1R (at least for ROC-SGSE pipeline...)

## RCS : SCML2RL2S

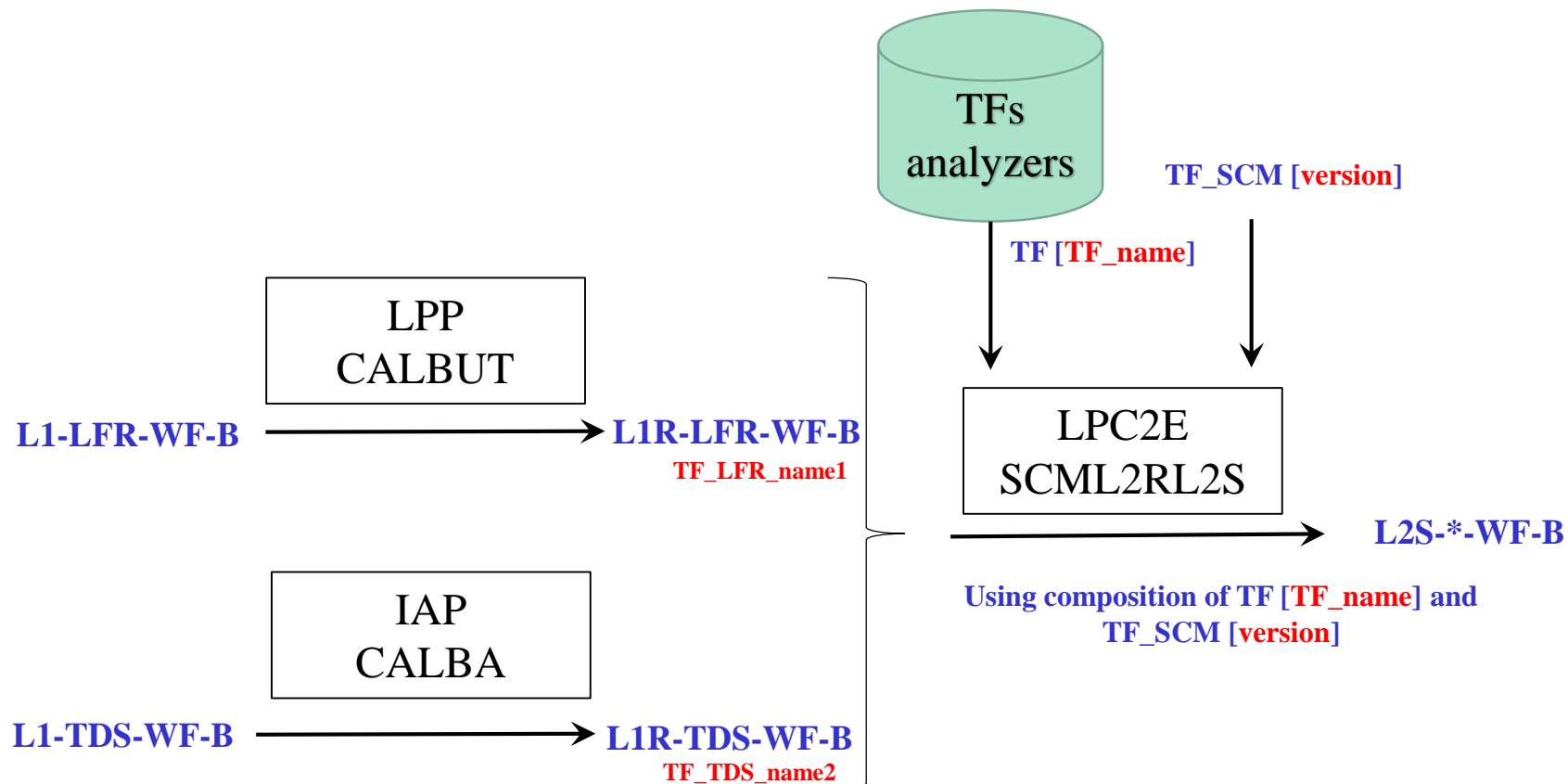
Version	Features	Delivery
V 0.1.0	Black box	2016-03-03
V 0.2.0	1 dataset (L2S_RPW-LFR-SURV-SWF-B)	2016-06-02
V 0.4.0	All (10) datasets with partial calibration. Input data are L1 or L2R.	2016-12-09
V 0.5.0	Changes in the structure of the SCM calibration file	in progress



# SCM L2S Datasets



from L1	from L2R	Dataset	Transfer Functions
<b>LFR</b>			
✓	✓	ROC-SGSE_L2S_RPW-LFR-SBM1-CWF-B_V02	SCM only (constant factor for LFR if source is L1)
✓	✓	ROC-SGSE_L2S_RPW-LFR-SBM2-CWF-B_V02	SCM only (constant factor for LFR if source is L1)
✓	✓	ROC-SGSE_L2S_RPW-LFR-SURV-CWF-B_V02	SCM only (constant factor for LFR if source is L1)
✓	✓	ROC-SGSE_L2S_RPW-LFR-SURV-SWF-B_V02	SCM only (constant factor for LFR if source is L1)
<b>TDS</b>			
	✓	ROC-SGSE_L2S_RPW-TDS-LFM-CWF-B_V02	
	✓	ROC-SGSE_L2S_RPW-TDS-LFM-RSWF-B_V02	
	✓	ROC-SGSE_L2S_RPW-TDS-SBM1-RSWF-B_V02	
	✓	ROC-SGSE_L2S_RPW-TDS-SBM2-TSWF-B_V02	
	✓	ROC-SGSE_L2S_RPW-TDS-SURV-RSWF-B_V02	
	✓	ROC-SGSE_L2S_RPW-TDS-SURV-TSWF-B_V02	



# Needs for the RCS

## Decisions from the ROC Meeting in Meudon on 17<sup>th</sup> january 2017:

- Analyzers teams will provide L1R data with same content as L1 plus the name of the transfer functions (TF) to use to transform L1R to L2R data. TF means gain and phase responses upon frequencies.
- Analyzers teams will provide TF data for every possible modes.
- Sensor teams will use TF[name] combined with the sensor TF to calibrate data in one step.

## In order to do so, the SCM team needs:

- all L1R skeletons for waveform data from LFR and TDS
- examples of L1R magnetic waveforms data file (1 example / dataset)
- all the transfer functions data including
  - every possible TF names
  - gain and phase responses

➔ We hope to have entries quickly

# Pipeline clarifications

What we understood concerning SCM waveforms:

## ROC-SGSE

L1 → L2R → L2S

## RODP

L1 → L1R → L2 (only way to use global TF if needed ...)

Is it right ???

We need to develop each mode twice:

- Calibration from L1R (full calibration : analyzer TF combined to SCM TF)
- Calibration from L2R (*only* SCM TF + [something](#))

[something](#) depends on what is done inside L2R. In the current data

LFR : constant factor to convert TM\_units into Volts (entries of LFR)

TDS : has the definitive TDS TF been used ???



Responsible of the RCS : M. Kretzschmar (20%)

Software manager : J-Y. Brochot (20%)

Software engineer : G. Cassam-Chenai (100%)

employment contract → december 2017

in the CNES contract we are supposed to deliver the RCS final version in  
15/12/2017

Not compatible with the planning of the ROC

(complete RCS must be delivered on 30/06/2018 - ROC-SGSE Teleconf #9)





## Software developments since the consortium meeting #18

- Creation of a local dataset ROC-SGSE\_STI\_RPW-LFR-SURV-SWF.  
For every L1 LFR snapshot, we computed the stimuli data in nT.
- Comparison between L1 LFR snapshots (calibrated) and STI (calibrated) during LFR sweeps:
  - Amplitudes → the “eye” curve
  - Phases → interpreted as clock drift(s) or ...
- Comparison between L1 LFR snapshots @F0 (calibrated) and L1 TDS snapshots (calibrated) during LFR sweeps:
  - Amplitudes factor ~ 2. (but not always)
- Comparison between L1 TDS snapshots (calibrated) and STI (calibrated) during LFR sweeps:
  - Amplitude curve looks like the “eye” curve for LFR (same slopes on the common frequency range)
- Comparison between L1 TDS snapshots (calibrated) and STI (calibrated) during TDS sweeps:
  - no dependence on the frequency (constant factor)
  - the constant factor is different
  - the factor can depend on the frequency

**All the software are using L1 data !!!, not L2S data. It should be good to validate L2S, but first we need to understand how to calibrate the data.**



# PFM tests using the RCS



Update of SCM L2S PFM tests data in:

[https://rpw.lesia.obspm.fr/roc/data/private/users/roc\\_sgse/data/incoming/scm/](https://rpw.lesia.obspm.fr/roc/data/private/users/roc_sgse/data/incoming/scm/)

Not much to say, because the RCS (V 0.4.0) will be highly changed.

A new error occurred:

Some L1 data files can't be opened due to an outdated leap second table.

That means that the leap second table was outdated **on the computer** that generated the L1 file.

(for example in ROC-SGSE\_L1\_RPW-LFR-SURV-CWF\_9ab8bcc\_CNE\_V02.cdf)

- Proposition : Change the name of the RCS: SCML2RL2S → SCMCAL,
- Correct the L2S skeletons,
- Create L2 skeletons
- Select the analyzer transfer function from its name in the L1R file,
- Merge the transfer functions (the analyzer TF combined to the SCM TF) at run time (adapted to the length of the data),
- Validation of the 10 modes must be redone (if possible comparison between L2S and L2),
- Continuing the investigation on PFM tests data.



**Thank you**

**for your attention**