https://wiki.virgo-gw.eu/Commissioning/Calibration/MaterialForCalibrationReviews

Valerio Boschi, Ettore Majorana (Chair), Shivaraj Kandhasamy, Alex Urban

O2 data reprocessing, Report on V1O2Repro2A release

Two documents, concerning this release have been discussed in the review:

https://tds.virgo-gw.eu/?content=3&r=13962 VIR-0013A-18
Advanced Virgo calibration for O2: update for h(t) reconstruction reprocessing V1O2Repro2

The accuracy of IN => END ITF transfer function has been improved, gaining 0.3 % in amplitude. A 10 us delay, already present in the model, was this time properly taken into account in hrec.
Studies of Optical response of PR mirror motion have been performed to gather some deeper understanding, but this part is planned to be tackled well before O3.

https://tds.virgo-gw.eu/?content=3&r=13962
V1O2Repro2A h(t) reprocessing for Virgo O2 data VIR-0014A-18

This is a clear document that has to be referred to previous release V1O2Repro1A. Minor changes, due refinements and relevant implementations are reported with detail.
In this document, the data specs and their filesystem location are reported.

New calibration mentioned in the first document is used.

Finesse is tracked using medians instead of mean values and not assumed as constant. In general, the passage from averages to median for Optical gains and Finesse allows an effective reduction of the RMS.

Importantly, as understood during the last long session of calibration campaign after O2, it turned relevant to track the SNR of the calibration lines to ensure the due significance.

Flags taking into account data quality have been implemented and reconstruction rendering improved.

Cross coupling due to ITF control channels have been rechecked (showing to be now reduced). Estimation of the calibration errors has been performed obtaining an error of about 4 %.

Overall sign of h(t) was checked.

Conclusions
- The actuator model is more accurate 1.1% (VS 1.4%)
- The reconstruction is more accurate 5.1% (VS 8%) in amplitude and 40 mrad in phase plus a timing uncertainty of 20 us (i.e. 0.04 rad + $2\pi*f*(20e-6)$ rad), to be added quadratically.
GREEN LIGHT