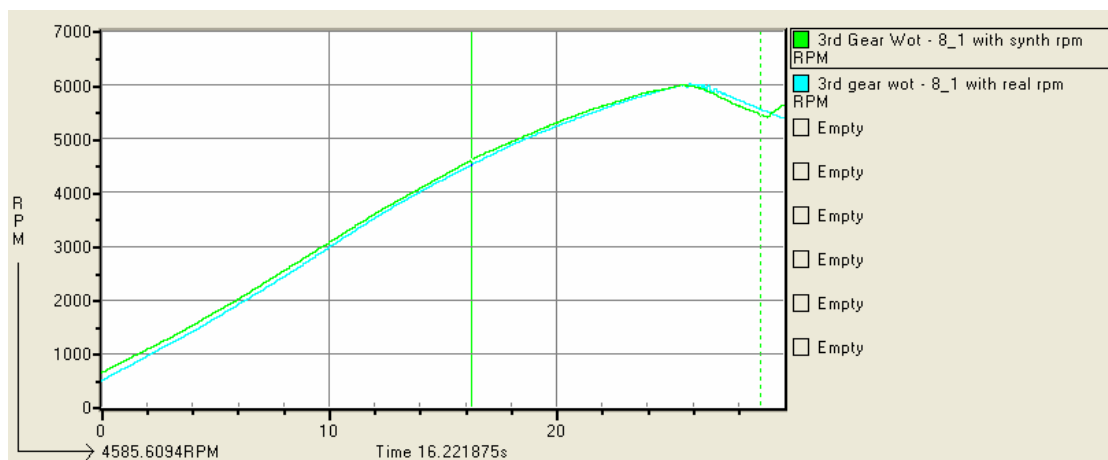


## Comparison of orders processed using the TachoGen Module with a real Tacho.

The TachoGen module, recently introduced into nVision, allows order data to be extracted from recorded time histories provided a known order is present. The data used in this note is from a VW engine running up in 3<sup>rd</sup> gear. The data channels are from a triaxial accelerometer, no calibration data was available. All levels are therefore arbitrary.

In figure 1 the rpm profiles from the synthesised and real tacho pulse trains are shown.

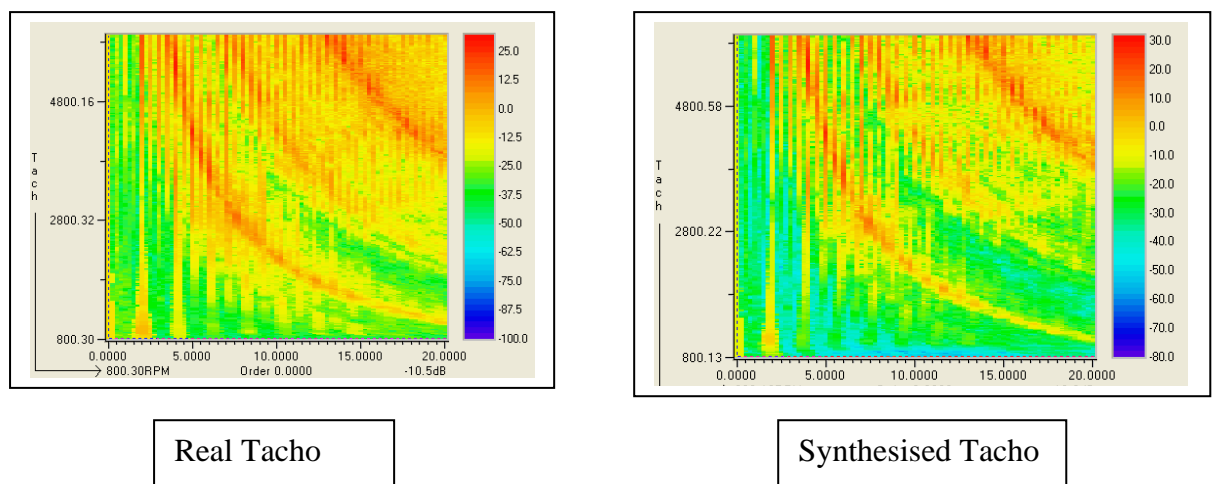
Figure 1 Comparison of real and Synthesised tacho pulse trains



The synthesised rpm profile generated by the TachoGen module is shown in Green. The Blue trace is the profile derived from the actual recorded tacho pulses. The profile shapes match very closely though there is an offset in time that changes during the course of the run up.

If the orders are now calculated using each of the rpm profiles the results are as shown in figure 2.

Figure 2. Colour contour plots of the orders



To accurately compare the results cuts are taken along some key orders, see figures 3, 4 and 5.

Figure 3. Comparison of 2<sup>nd</sup> Order for **Synthesised** and **Real** Tacho

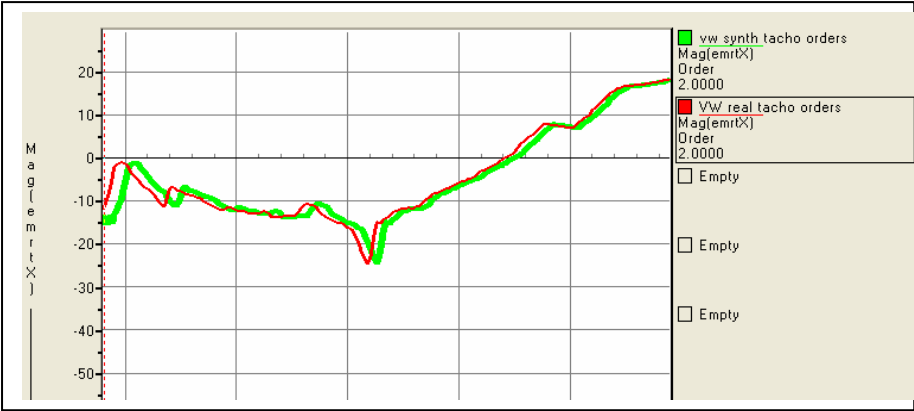


Figure 4 Comparison of 4th Order for **Synthesised** and **Real** Tacho

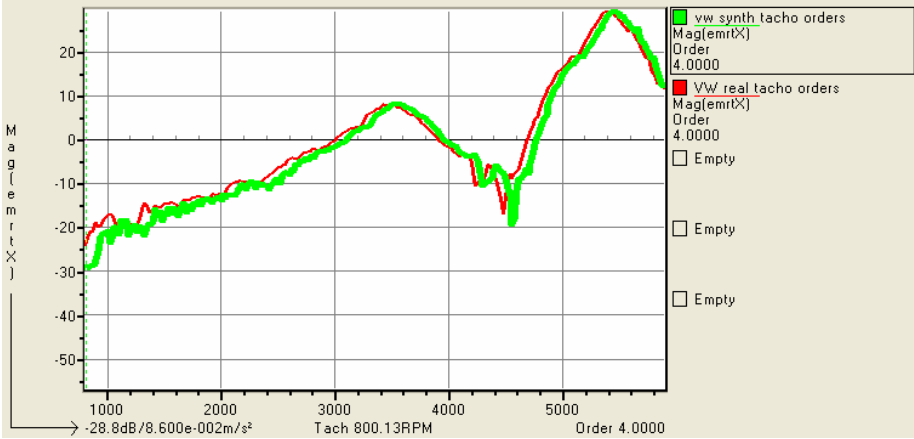
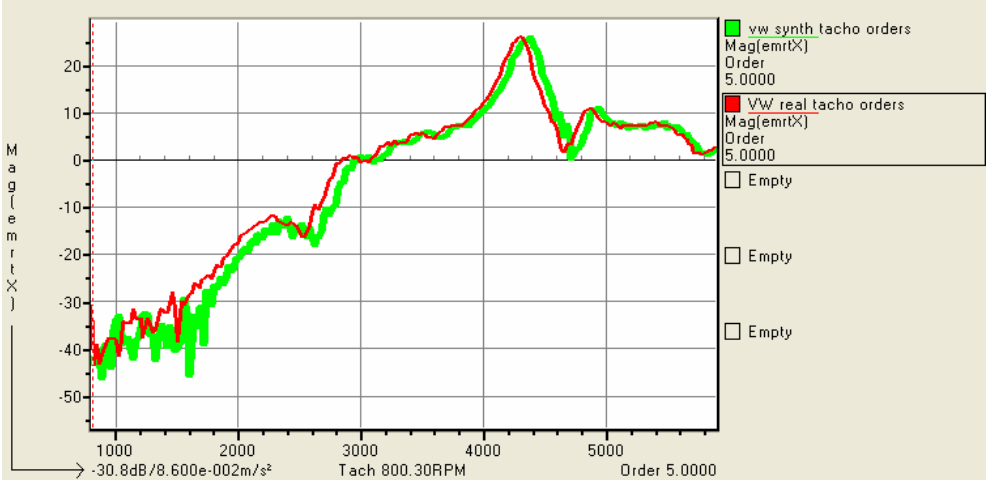
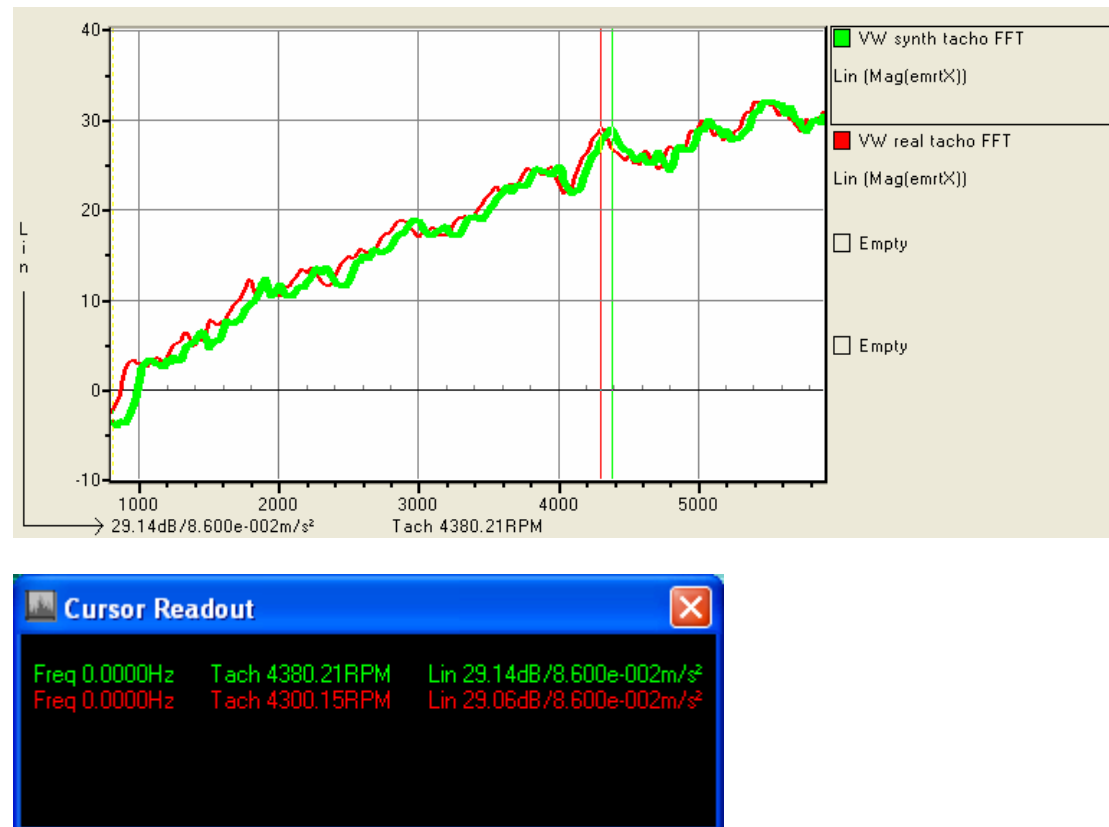


Figure 5 Comparison of 5th Order for **Synthesised** and **Real** Tacho



Finally the comparison with overall level, this should be identical as the data is the same, figure 6 shows that this is true.

Figure 6. Overall Linear level for both Synthesised and Real data sets.



Overall level is within 0.5dB when the identical feature in the run is chosen. The apparent offset in rpm at 4300rpm is 80rpm.

### Remarks.

The results very similar in level < 0.5dB different.

There is an offset of up to 100rpm between the two sets of results due to the time delay in the tacho smoothing module.

### Conclusions.

The TachoGen algorithm provides a fast and reliable means of extraction reliable rpm and order based data from measurements where a tacho pulse train could not be acquired or, for some reason, the pulse train is of very poor quality.

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