automotive engineering iav

Transmission Driveability Toolbox (TDT)

Objective Drivability Evaluation and INCA-FLOW

The growing variety of powertrains and the complexity of systems for controlling automatic transmissions are seeing calibration work spiral. This trend must be underpinned with strategies and processes that are capable of ensuring calibration quality, making an objective evaluation of drivability absolutely crucial. Unlike any subjective assessment, it guarantees the necessary reproducibility and granularity of judgment. The laws of physics, such as in the shifting process, are a suitable basis for evaluating drivability.

TDT makes it possible to evaluate different events of relevance to drivability by identifying physical evaluation criteria from data measured. These can be visualized and, for example, compared with reference results. This provides a very simply way of revealing the variation in calibration quality between a reference vehicle (lead version) and the calibrated object (derivative). As a result, the engineer gets information on calibration and the results can be used for documentation.

TDT is engineered by IAV and available as toolbox in the latest release of INCA-FLOW.

Functionalities:

- *Objective evaluation of drivability*
- *Visualization of physically based criteria*
- *Support in the calibration process*
- *Documentation of calibration quality*
- *Interface to automated calibration*

Application cases:

- *Calibration (manual and automated)*
- *Benchmarking*
- *Limit sample and field analyses*

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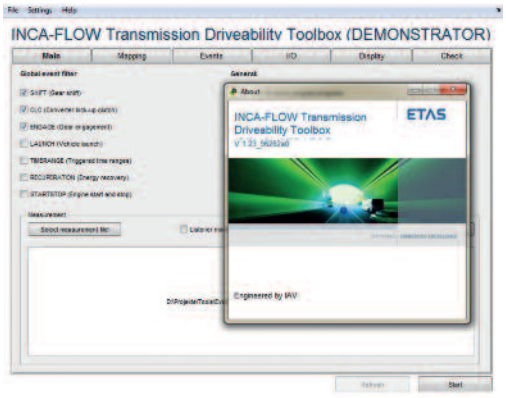
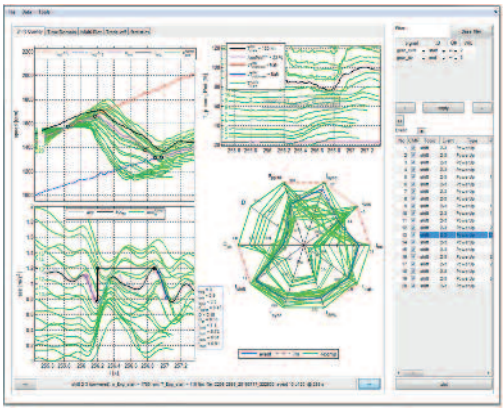
Key Features



Central user interface



Shift quality analysis

Measurement Data Recording

TDT reads file formats of commonly used calibration and measurement software, such as from ETAS© and Vector©. In the vehicle this makes it possible to work in the native measurement environment and measurement configuration.

The input signals required are often available on the vehicle CAN, in most cases obviating the need for further measuring equipment.

Criteria Extraction

Evaluation in TDT takes place on the basis of criteria that are extracted from the signal curves. To evaluate drivability, physically based characteristics can be used that are identified, for example, in the longitudinal-acceleration time curve. Other criteria relating to wear or agility can be derived from clutch pressures and engine speed curves.

Visualization

The criteria identified can be visualized on the time curve as well as in multi-dimensional radar diagrams. TDT also comes with analysis tools, such as a trade-off diagram, that can be used for further-reaching studies.

Documentation

TDT evaluation results and diagrams can be exported to MS Excel© or MS PowerPoint© for documentation purposes. This means the results can be processed in any way and used for documentation.

Interfaces

Measured data can be transferred through the TDT API and evaluated. As such, TDT can be used in optimization loops, such as in automated calibration, or in conjunction with commonly used measurement software, such as Vector© CANape, directly in the vehicle.