**Powertrain Calibration Solutions**

**Data Acquisition**

- XCP on Ethernet with VX1000
- ECU access via microcontroller-specific data trace and debug ports
- Data rates up to 50 MB/s or higher and sample rates up to 100 kHz (10 µs)
- Low latency for rapid prototyping and bypassing
- Powertrain specific features: Cold start, calibration wake-up etc.

**Bus Access**

- Bus interfaces for CAN, CAN FD, LIN, FlexRay, Automotive Ethernet, BroadR-Reach
- High data throughput
- Precise time stamps
- Highly flexible with large selection of interchangeable bus transceivers

**Analog Measurement**

- CSM Measurement Modules
- For the acquisition of physical signals on the road or in test benches
- Measurement data rates up to 800 kHz per signal
- Precise synchronization of all signals and ECU data
- High voltage safe
- Compact and robust CAN and EtherCAT modules
- Measurement data protocol via CAN, EtherCAT or XCP on Ethernet

** Measurement & Online Calibration with CANape and Measurement with vMeasure exp**

- Measurement
- ECU buses, analog/digital, diagnostic data, GPS, video, audio in one recording
- Time-sync for all signals
- Triggers & markers
- Bus and diagnostic traces and signals
- Analog and digital measurement technology with high sampling rates

- Calibration
- CCP/XCP standard based
- High-performance microcontroller-specific interface to ECUs
- Bus monitoring and stimulation
- Model execution/bypassing
- Automation by scripting and APIs

- Diagnostics
- Diagnostic databases (COD, ODX, MDX)
- DB access
- Powerful diagnostic console
- Fault memory window
- Full scripting access (with integrated language CALS)

- Rapid Prototyping
- PC-based bypassing
- Real-time prototyping with VN8911 and VN8914

- Recording
- All measurement plus:
  - Configuration management
  - Data transmission via USB, Ethernet, memory cards
  - WLAN/WiFi or 3G/UMTS
  - Fleet validation
  - Versatile accessories

**Measurement & Calibration Services**

Commonly required functions to work with automotive embedded data (writing measurements, reading hex files, editing calibrations, etc). Software from Vector is using this layer to provide high level functionality to users. Measurement & Calibration Services can be used to build custom calibration tools on top, helping to focus on the problem, not the basics.

**Offline Calibration**

- vCDMstudio
  - Graphical copy, merge, compare of multiple parameter sets at once
  - Configurable multi-level filtering of parameter views
  - Flexible report generation with various output formats, for example MS Excel, HTML, PDF
  - Integrated automation interfaces
  - Direct integration in ETAS INCA
  - Support of all typical data formats (Hex, STI, DCM, PAR, PoCo, CDF 2.0, CSV...)
  - Rule-based processing of parameter sets
  - Plug-in concept to develop custom calibration tools

- Measurement Analysis
  - vSignalyzer
    - Signal- and message-oriented offline evaluation of measurement data, from manual analysis to automated data mining
    - Analysis based on integrated functional language, user-generated DLLs, MATALB/Simulink models and click-and-go editor
    - Report generation with customized print layouts
    - Rich support of measurement data formats (MDF4, MDF3, DAT, BLF...)

**Model-Based Calibration**

- CANape + MATLAB/Simulink
  - Simplified generation and integration of model DLLs into CANape
  - Visualization models and navigate inside
  - Windows PC or real-time platform VN8900
  - Stimulation with online measurement data or measurement files
  - Automation of calibration procedures and optimization of parameters by internal script language or MATLAB

**ADAS Development**

- vADASdeveloper
  - Multisensor data fusion
  - Algorithm prototyping, development and verification
  - Stimulation with online measurement data or measurement files
  - CANape provides online sensor and bus data
  - Debugging of algorithms by Visual Studio integration
  - Rapid prototyping of applications with multiple sensors

**Data Management**

- vCDM – Calibration Data Management
  - Complete process support – project creation, calibration data delivery, dataset integration, software change
  - Flexible concepts for managing dataset variants with attributes, components, derivations, dependencies and rules
  - Conflict detection & resolution based on work packages
  - Seamless integration of MCD tools (CANape & INCA)

- vMDM – Measurement Data Management
  - Data mining & analytics with workflows and collaboration
  - ASAM MDD-based, non-SQL measurement management
  - Fast search procedure for measurement & meta data
  - Scalable server architecture from desktop to Hadoop big data clusters
  - Open modular concept allowing for extension and customization

**3rd Party Tools**

- IPETRONIK
- DREWETRON
- ETAS
- Others...

**3rd Party Analog**

- ETAS INCA
- ATI Vision
- Others...

**Team Services**

Commonly required functions to share automotive embedded data between tools and users. Software from Vector uses Team Services to enable easy collaboration between users, or integrate Vector products with custom software and enterprise applications.

**Enterprise Integration**

Integration with core enterprise applications that support the primary business processes for planning, development, manufacturing and service.

- Application Lifecycle Management
- Enterprise Resource Planning
- Corporate IT/Cloud
- Supply Chain Management
- Office Suite