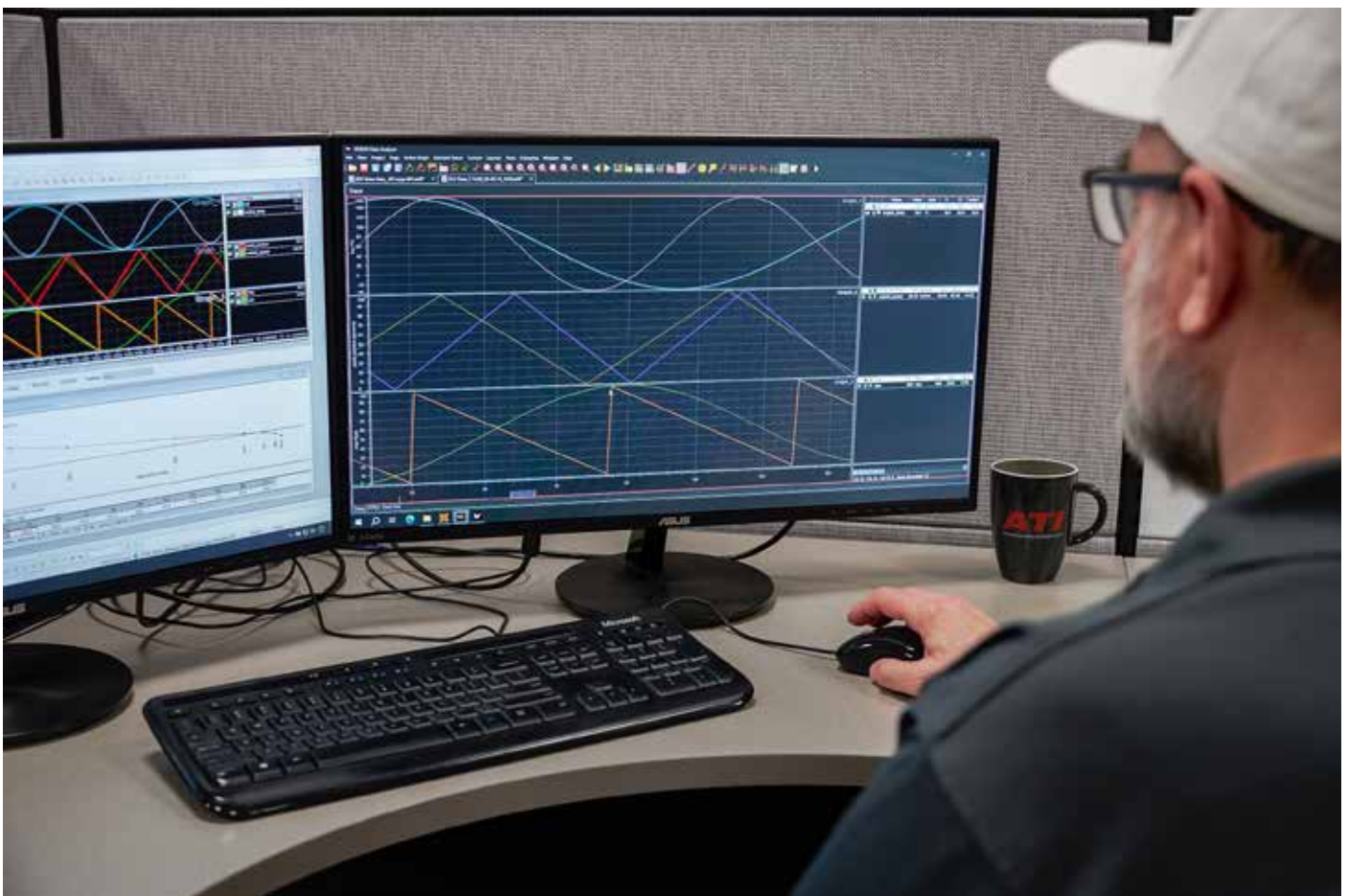


One File Format, Three Time Zones: How MDF4 Keeps Distributed Development Teams in Sync

It is 6:40 on a February morning at a winter test facility in northern Sweden, and a durability engineer named Anna is scraping frost off the connector panel of a prototype SUV. Somewhere under the rear seat, a compact DLX2 data logger from Accurate Technologies has been recording all night: five channels of CAN FD traffic, thermocouple readings from the battery pack, inertial data from the built-in IMU, and a GNSS trace of every loop of the frozen lake circuit. Anna doesn't pull an SD card or plug in a laptop. She starts the next test run, and as the vehicle passes within range of the facility's Wi-Fi, the DLX2 quietly uploads its overnight logs to the cloud.

Four thousand kilometers away in Michigan, a calibration engineer named Mark opens his browser with his first coffee of the day. The files from Sweden are already waiting in VISION Enterprise, timestamped, cataloged and ready to open. He didn't email anyone or chase a shared drive link or wait for someone to remember to sync a folder. By the time the team in Bangalore starts its analysis shift eleven hours later using VDA, the same dataset, bit for bit identical, is already in front of them.

The technology making this possible is not simply a data logger or an analysis package. At the center of the workflow is something far less visible but equally important: the file format.



The Problem MDF4 Was Designed to Solve

Anyone who has worked on a multi-site vehicle program knows the frustration. The chassis team logs in one proprietary format, the powertrain team in another, and the supplier in a third. Data arrives as email attachments, USB drives couriered between sites, and CSV exports that have quietly lost timestamp resolution or metadata somewhere along the way. Half of every analysis meeting is spent arguing about whose copy of the data is current, and whether channel 47 in one file is really the same signal as channel 47 in another. ASAM MDF4, the Measurement Data Format standardized by the Association for Standardization of Automation and Measuring Systems (ASAM), was developed to address these problems. An MDF4 file is self-describing: signal names, units, conversion rules, sample rates, and source metadata travel inside the file itself.

It also handles asynchronous data from very different sources, from a 1 ms CAN FD message stream to a 10 Hz thermocouple or GNSS position data, while maintaining the correct timing relationship between them. Because MDF4 is an open standard, a file recorded in Sweden can be opened by engineers in Michigan, Bangalore or Stuttgart using any compliant analysis tool, without proprietary conversion utilities or the risk of losing valuable metadata.

For a distributed team, that last point is everything. MDF4 turns measurement data from something tied to a specific PC, tool chain, and engineer into a portable, software agnostic reference file.

Capturing the Data

Of course, a standard is only as useful as the devices writing to it.

One implementation of this approach is Accurate Technologies' DLX2 data logger. As a standalone logger, the DLX2 records up to five CAN/CAN FD channels alongside LIN, RS-485, analog, digital and thermocouple inputs, plus integrated IMU and GNSS measurements, while writing directly to an SD card in ASAM MDF4. There is no proprietary intermediate format, no conversion step where metadata leaks away. The measurements recorded at three o'clock in the morning on a frozen lake are the same measurements an analyst opens a few hours later on another continent.

Just as importantly for teams spread across sites, the log configuration is repeatable. Using the DLX2's One Click Logger Configuration together with VISION Recorder profiles, the test engineer in Sweden, the applications engineer in Germany and the intern instrumenting a development vehicle in Detroit can all deploy an identical logging setup. Consistent configurations produce consistent MDF4 file structures, which means analysis scripts written once run everywhere, reducing the likelihood of someone discovering late on a Friday afternoon that two supposedly identical logging configurations were sampling the same thermocouple at different rates.

Because the DLX2 also supports XCP and CCP for ECU communication, vehicle network traffic and internal ECU measurement data can be recorded within the same synchronized dataset, simplifying subsequent analysis.





Sharing the Results

Capturing clean measurement data solves only part of the challenge. In globally distributed development programs, the data must also be available to everyone who needs it without relying on manual file transfers or local copies that quickly become outdated.

This is where centralized data management becomes equally important. VISION Enterprise provides a common repository where completed measurement files can be uploaded automatically whenever connectivity becomes available. No SD card shuffling, no remembering which folder contains the latest files and no wondering whether someone copied the data before wiping the storage card.

The benefits extend beyond simply moving files. Because MDF4 files carry their own metadata, VISION Enterprise can organise them meaningfully: by vehicle, test campaign, date or measurement configuration. The Michigan calibration engineer, the Bangalore analysis team, and the program manager in Coventry are all working from the same authoritative copy. Version confusion, the silent killer of distributed engineering, has no opportunity to take hold. When questions arise about an unexpected event during a cold-weather durability test, everyone opens the same file and sees the same samples.



DATA
ACQUISITION



ECU
CALIBRATION



ECU RAPID
PROTOTYPING



ECU
INTERFACES



CAN
BUS
INTERFACES



NETWORK
SOLUTIONS



TEST CELL
MEASUREMENT

One Dataset, One Engineering Team

Back in Sweden, Anna's shift ends just as the winter daylight begins to fade. Before leaving for the evening, a message arrives from Mark in Michigan. Reviewing the overnight battery temperature data, he noticed a gradual sensor drift and asks if she can check it before the following day's testing begins. He identified the issue only hours after the measurements were recorded, despite the engineering teams working on different continents and across multiple time zones, without a single file ever being transferred manually.

That illustrates why open measurement standards have become increasingly important for modern vehicle development. ASAM MDF4 provides the common language for that collaboration. Combined with connected data logging, centralized data management and powerful analysis tools, it helps reduce delays caused by proprietary file formats, manual transfers and version-control issues. One implementation of this workflow combines the DLX2 data logger, VISION Enterprise and VDA, enabling geographically distributed engineering teams to work from the same complete dataset and spend less time managing files and more time understanding what the data is telling them.



For further information:

VDA: <https://www accuratetechnologies.com/PDFs/VISION%20Data%20Analyzer.pdf>

DLX2: <https://www accuratetechnologies.com/PDFs/DLX%20%20Datalogger%20EN.pdf>

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