



Rising to Multisensor Challenges

Superior tool chain for ADAS
and automated driving

dSPACE and Intempora signed a cooperation that aims at providing a superior tool chain for developing advanced driver assistance systems and highly automated driving functions. In line with this agreement, dSPACE will globally and exclusively distribute RTMaps from Intempora, an unparalleled software environment for multisensor applications.

Multisensor applications play an essential role in many areas such as advanced driver assistance systems, autonomous driving, multimodal human-machine interfaces, robotics and aerospace. Developing these kinds of applications in the lab or in the vehicle typically requires capturing, synchronizing and processing data in real time from various sensors such as cam-

eras, laser scanners, radar sensors or GNSS receivers and interfacing with communication networks, such as CAN, LIN or Ethernet. During the test and development phase, it is also essential to be able to record, visualize and play back time-correlated data. RTMaps (Real-Time Multisensor applications) from Intempora (www.intempora.com) is designed specifically for these use cases. It provides

a modular development and run-time environment for x86- and ARM-based platforms supporting operating systems such as Microsoft Windows® and Linux.

Seamless Integration of RTMaps into the dSPACE Tool Chain

dSPACE integrates RTMaps tightly into its comprehensive tool chain with an interface blockset designed spe-



“RTMaps is a perfect fit for the comprehensive dSPACE tool chain, which today can be seen as a de facto standard for ECU software development. Hence, we are proud to team up with dSPACE as a market leader whose worldwide recognition and distribution capabilities will foster the future development of our highly innovative product RTMaps in this field.”

Nicolas du Lac, Managing Director, Intempora

cifically for bidirectional, low-latency communication and time synchronization between RTMaps and dSPACE tools like real-time systems or the PC-based simulation platform VEOS®. The experiment and visualization software dSPACE ControlDesk® Next Generation can also be connected to RTMaps via the ASAM XIL API. With this connection, users can monitor and parameterize components which

are implemented and processed in RTMaps.

Overview of RTMaps

RTMaps (figure 1, figure 2) from Intempora is a component-based software development and execution environment which enables users to time-stamp, record, synchronize and play back data from various sensors and vehicle buses. By means of block

diagrams and the integration of the user's own C++ or Python code via dedicated software development kits, it provides a powerful environment for integrating, testing and benchmarking advanced functions such as signal processing, computer vision and data fusion in the context of multisensor applications. Comprehensive component libraries for various automotive sensors and

>>

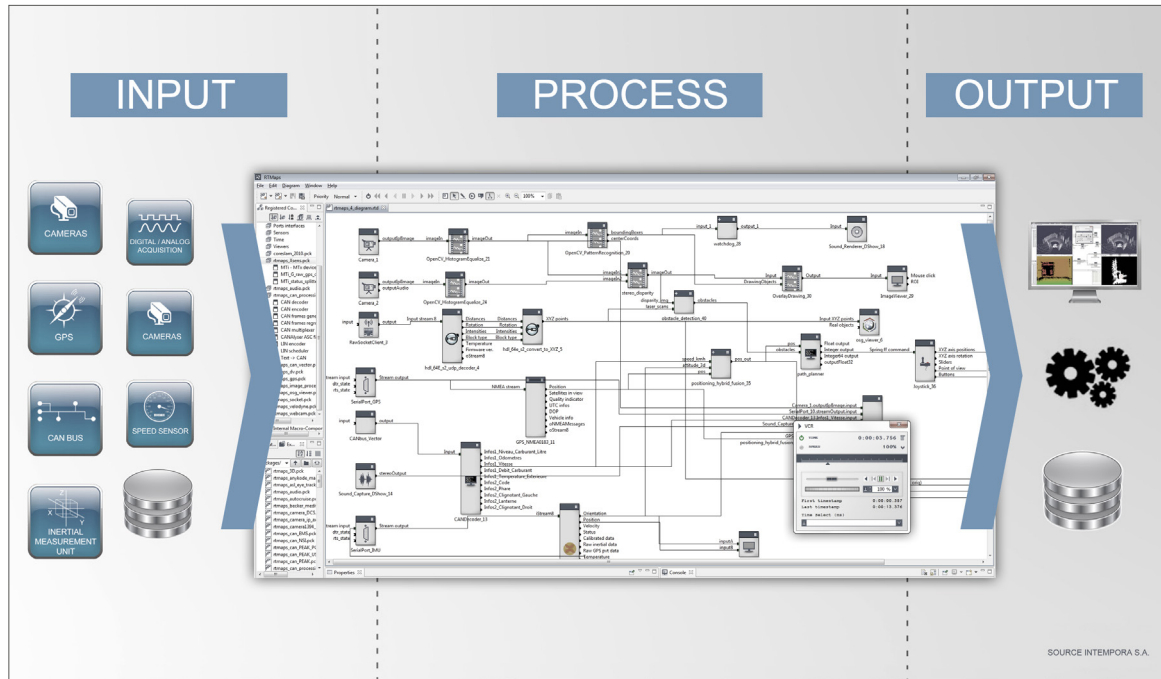


Figure 1: The work method of RTMaps (Real-Time Multisensor applications): The data from various sources, such as cameras, laser scanners, and radar sensors, is captured, precisely time-stamped, processed and visualized in real-time. Because all data is recorded with time correlation, the user can also play back the data synchronously for offline development.

buses, visualization functions, data communication, preprocessing, etc., facilitate function development. In addition to ADAS and automated driving, the application areas of RTMaps extend to mobile robots and advanced human-machine interfaces, among others. The development of the powerful software architecture of RTMaps started at the renowned and prestigious École des Mines de Paris University in 1998.

Facts About Intempora

Intempora was founded in 2000 on the basis of research performed at the Center of Robotics of École des Mines de Paris (now Mines ParisTech). Since then, the company's team of software engineers has been working on the development of RTMaps and related products, turning them into a robust and easy-to-use software framework and meeting the needs of demanding customers from the

industry. Among others, Intempora is member of the Groupement ADAS, a team of members of the French Mov'eo cluster, which is dedicated to the field of advanced driver assistance systems.

Summary

dSPACE and Intempora have signed a strategic partnership for establishing a superior tool chain for ADAS and automated driving. For this, dSPACE integrates RTMaps,



“The cooperation between dSPACE and Intempora is an essential milestone in our strategy to provide a complete tool chain for ADAS and automated driving. Due to its superior performance on multicore x86 and ARM platforms and its ease of use, RTMaps ideally extends our product portfolio.”

André Rolfmeier, Lead Product Manager for Advanced Applications and Technologies, dSPACE

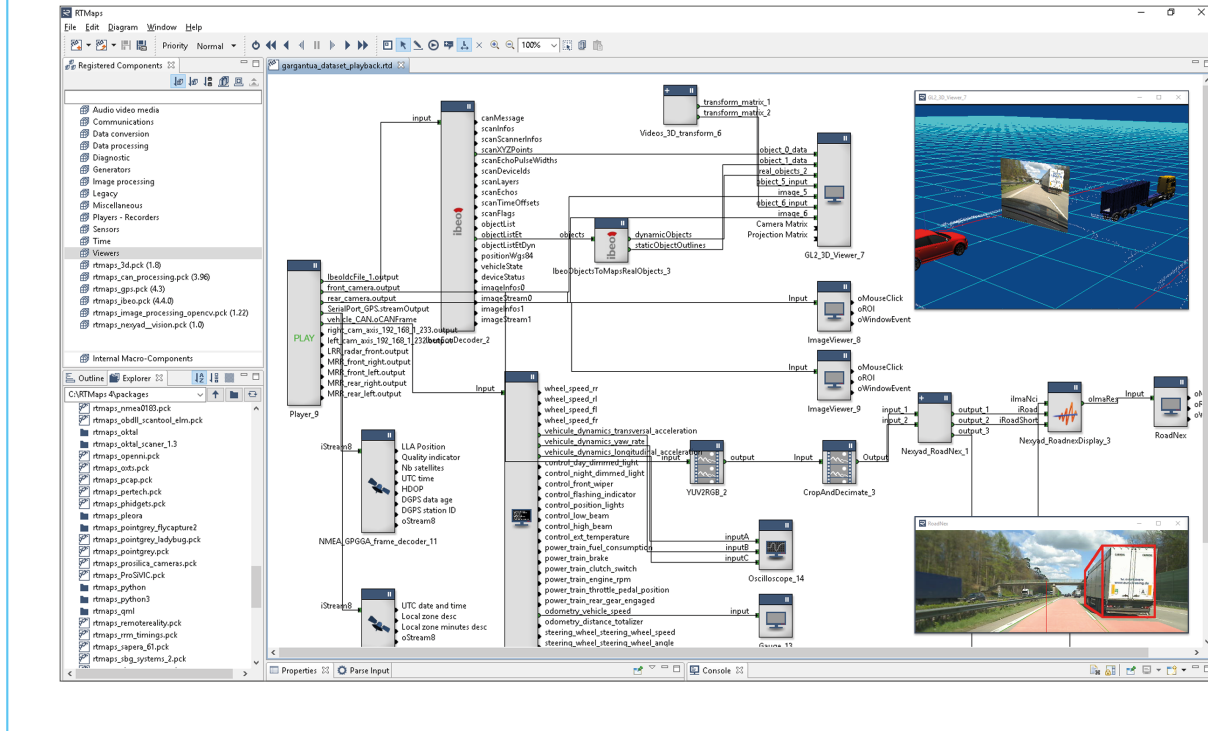


Figure 2: The user interface of RTMaps: A modular, multithread framework for real-time multisensor applications. The user benefits from comprehensive component libraries for a wide range of sensors, buses and perception algorithms. It is even possible to process data on multiple distributed platforms while preserving time coherence and synchronization of heterogeneous data streams.

Intempora's software environment for developing multisensor applications, into the dSPACE tool chain by providing dedicated interfaces to its prototyping and simulation platforms and ControlDesk. And there is more to come ... stay tuned. Apart from France, which will be served by Intempora itself, dSPACE will also globally and exclusively distribute RTMaps. ■

The video shows RTMaps in action.
www.dspace.com/go/dMag_20161_RTMaps



For more information about RTMaps, see
www.dspace.com/RTMaps

Overview of Supported Sensors, Buses, and Protocols

- Cameras (GigE Vision, USB 2.0, USB 3.0, FireWire, analog, Camera Link, HDR, etc. from Point Grey, IDS, Basler, AVT, NIT, etc.)
- Stereo-vision heads
- Laser scanners (Ibeo, Velodyne, SICK, Hokuyo, Quanergy, etc.)
- Radars (Delphi, Autocruise, Continental, etc.)
- Time-of-flight sensors (LeddarTech)
- CAN, LIN (PEAK, Vector, NI, .dbc files decoder, etc.)
- GPS, IMUs (SBG Systems, OxTS, Xsens, VectorNav, iXSea, Phidgets, etc.)
- Communication (TCP & UDP, ASAM XCP over Ethernet, DDS, ASAM XIL API, etc.)
- Eye trackers (Pertech, facELAB, Smart Eye, SMI, The Eye Tribe, etc.) and biometrics (BIOPAC, Becker Meditec, etc.)
- Motion capturing (Kinect, Xtion, Vicon, etc.)
- Access to I/O and bus signals of dSPACE MicroAutoBox and AutoBox
- ... and much more