Intempora S.A.

^{RT}Maps

"Real Time, Multisensor, Advanced Prototyping Software"

The ^{RT}Maps software allows to easily connect any type of sensors and actuators, to acquire, record, process and transmit every data, in real time.

• A *generalized digital recorder*, a platform for acquisition, recording and processing of all data types, in *real time*.

• A *software* associating a simple and intuitive interface and a robust technology.

• A *multisensor measurement instrument*, powerful, precise and adaptative.

• A *capacity to date, read again and exchange* with precision quantities of information.

• A *development platform* to create one's components and add them to the many others provided.

• A *link between data*, allowing their fusion and their transmission towards actuators.

• A *methodology* allowing to program graphically and easily complex applications.

• A *link between theory and practice*, experimentations and applications.

• A *tool to master* the most innovative projects...

Have a good *real* time !

RTMAPS, INTRODUCTION
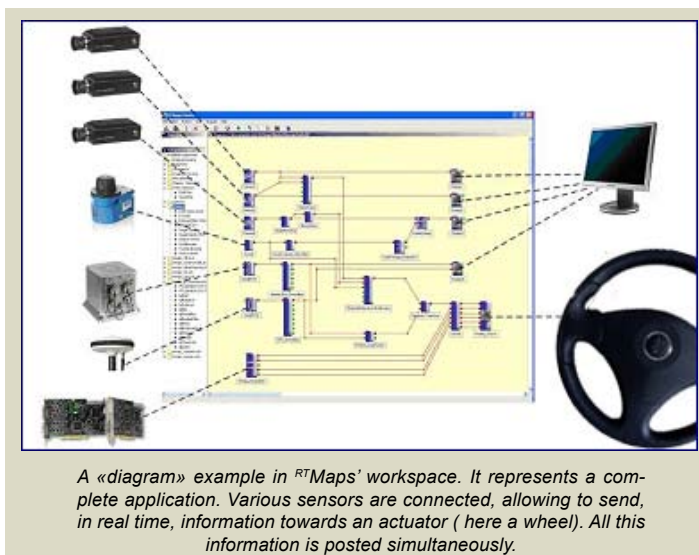
A New Multisensor Technology

In 2000, the *Carsense* European project, gathering industries (*FIAT*, *BMW*, *Renault*, *Thales*, *Ibeo*) and research labs (*INRIA*, *LIVIC*...) looked for a digital data logger and chose a solution developed by the «Centre de robotique de l'Ecole des Mines de Paris»: RTMaps. The objective was the perception of the objects around a moving vehicle. It was the first use of RTMaps. RTMaps is now adopted by important industrial groups (*Renault*, *PSA*, *Valeo*...) and by national and European projects (Arcos, Puvame, REACT...).

Time and measurement play an essential part in the industrial and robotics applications: hence RTMaps precisely dates all data at their time of acquisition. This dating process provides a complete data flow control during the data processing and replaying. During the tests, situations and behaviors can be recorded and analysed later. Reproducing a situation is thus possible. RTMaps makes easy the link between real and virtual worlds.

Connect, record and compare all types of sensors and actuators

Any device suitable for connection with a computer, can be dealt with by RTMaps. Information from the sensors is acquired; processed data is sent to the actuators; inbetween, a working space is dedicated to the user. Connections between various elements are achieved graphically without any difficulty. The substitution of a sensor by another is thus done quickly. Comparison of information obtained according to various types of sensors or technologies is straightforward: video cameras, analogical and numerical ways, CANbus, GPS, radars, laser... A *recorder* allows the simultaneous recording of various tracks of information. Information is stored in *STDB*, *Synchronized Timestamped Databases*. When replayed, the sequence is reproduced identically thanks to the data timestamps. It is possible to play information at the desired speed: accelerated, slowed down, step by step...

A controled investment

The graphical interface allows a fast installation and an easy evolution of the different applications. Functional bricks (in the form of components) and data (STDB) are exchangeable and reusable. The test and experimention phases are simple and fast to implement. While allowing to save a considerable amount of time, RTMaps' use reduces the development costs and the « time to market ». In perfomance and efficiency, RTMaps' potential warranties a fast and convincing return on investment.

A «diagram» example in RTMaps' workspace. It represents a complete application. Various sensors are connected, allowing to send, in real time, information towards an actuator (here a wheel). All this information is posted simultaneously.

Fuse data in real time and prototype effectively

Data fusion of information from various sensors, different or not, increase the reliability and robustness of the results. It also allows the use of less expensive sensors. Several assumptions can be easily tested in order to satisfy the most complex needs. It is easier to perform more tests in simulated situation with real data, to identify problems and to correct them progressively, before engaging the product in real conditions of experimentation or production.

Preserve and share knowledge and data

It is always difficult to collect data corresponding to the real situations. With RTMaps, such sequences can be preserved and easily exchanged thanks to the *STDB*. They are reusable at will. RTMaps allows the users to build important data banks in order to capitalize and share all the experiments. Team work and project management are really simplified.

New releases and updates

Intempora permanently improves RTMaps. Updates are regularly posted on the Internet site and accessible to all the users under maintenance contract. Major release are the results of important technological, functional and/or ergonomic improvements. The migration towards each higher version is easy. The investments of each user are thus preserved; data bases and diagrams remain valid and can benefit of the new tools and available evolutions. The third version of RTMaps is installed and used by our clients since june 2005.

References et partners

ᴿᵀMAPS, TECHNOLOGY

The studio : graphical programming

The Studio is ᴿᵀMaps' graphical interface. Applications are represented by diagrams made of components which can be parametrized. Efficient and simple to use, the Studio is one of the many advantages of the software: a few minutes are enough to set up a complex application. Components, libraries, diagrams, data bases and scénarii can be exchanged and integrated.

Components and connections

The components, symbolized by blue boxes, are set up by simple drag and drop onto the scene. They interface the sensors, represent the algorithms and connect the actuators. The mouse allows to draw «lines» connecting the output of a component to the input of another. The dataflows are then etablished.

Setting

Many parameters are accessible by dialogboxes. The setting determines the component's behavior.

Documentation

A simple click is enough to insert a comment in a diagram or to get help.

Modularity

When the user wishes to remplace or add a component in a diagram, it does it graphically, without any coding.

### Recording and replaying

A «record» button launches the recording process. The VCR allows to play back the data bases. The replay speed and direction can be chosen. A cursor allows to select the position in the timeline.
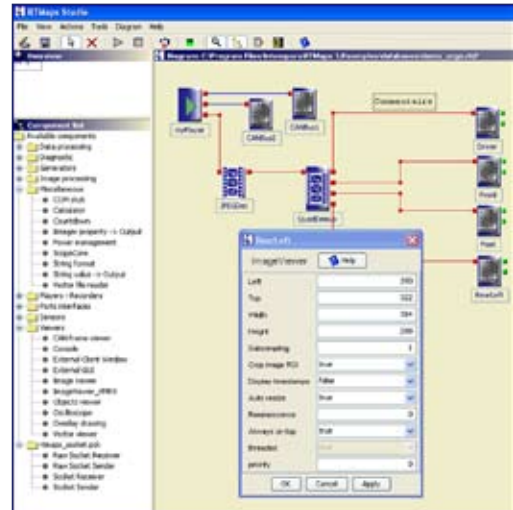
Embedded technology

The programming graphical interface can be removed for a «hidden» use of the software. The orders of construction and parameter setting of diagrams are passed through scripts. Specific graphical interfaces can be developed to execute applications : they replace the usual workspace.
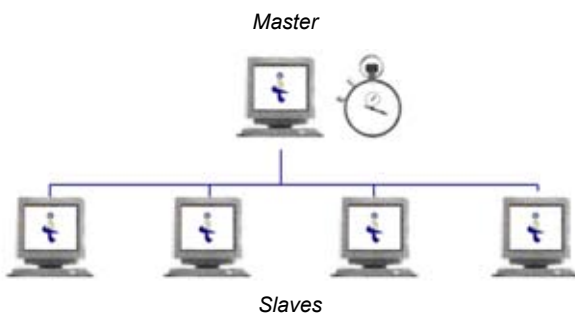
Synchronized distributed operation

ᴿᵀMaps V3 breaks a technological barrier by allowing the operation of distributed and synchronized platform on several machines. A «master» system manages the whole application. A single clock supervises and synchronizes those of the various «slaves». The «Master» clock can be the one of the «master» host or coming from an external source: clock of an acquisition board, GPS clock...

ᴿᵀMaps technology is independant of the operating system used, even in a distributed configuration. Thanks to this new flexibility, ᴿᵀMaps can satisfy the processing needs of the most demanding applications.

Master

Slaves

The library: components ready to be employed

The ^{RT}Maps libraries are sets of components which provide elementary functions necessary to most applications:
- Data acquisition
- Standard protocole decoding
- Data processing
- Real time displaying
- Data recording and replaying
- Data exportation
- Interfacing with third party software
- Communication

The software supports the majority of the market's available sensors. Intempora provides many modules to interface sensors/actuators of very different natures and performances. If an hardware is suitable for connection with a computer, its integration in a ^{RT}Maps application is possible.

Examples of supported sensors:
Webcams, DV camcorders, FireWire DCAM digital cameras, analog and digital cameras, stereo-vision devices, GPS, inertial measurements units, radars, laser telemeters, CAN bus, analog and digital input/output devices, microphones…

Examples of supported actuators:
Analog and digital controls, electric motors, step by step motors, brake or other car system, barriers, hooters, light, variable messages indicators…

New developed components are regularly added to the libraries.

The SDK extension: breaking the limits

The «Software Development Kit» allows the user to create its own components. The programming is done in C++; it is facilitated by the skeletons' code and macro. Moreover, a complete API (Application Programming Interface) allows you to reach all the engine's function and to remain independant of the operating system (file system or real time programming for example).

Unless specify otherwise, each component runs in its own thread. The developer is released from the problems of data protection and inherent concurrent accesses of multithreads applications. Many data exchanges policies between components are integrated (circular buffers, unblocking, D-sampling, etc...), thus offering the behavior choice fitting to each application type (recording, real time processing, data conversion, control...). The user can, for example, include the variables parameter setting or make dynamic the inputs/outputs number suggested by the graphic component.

The SDK includes the API's complete documentation and examples or skeletons code for the specific components development. Finally, integrated assistants are included into the development environments (such as Microsoft's Visual Studio). They facilitate the generation of compilation projects.

Intempora
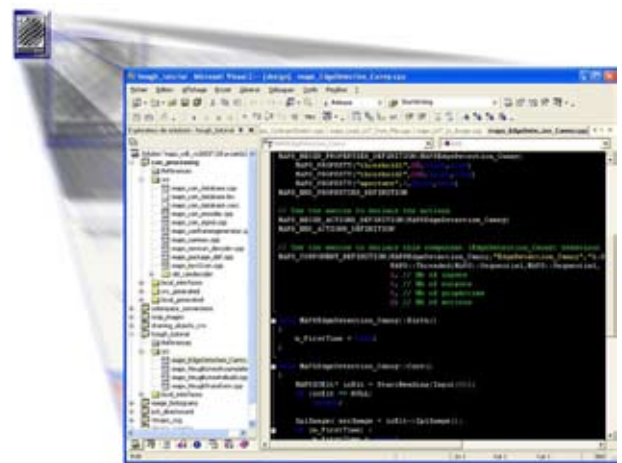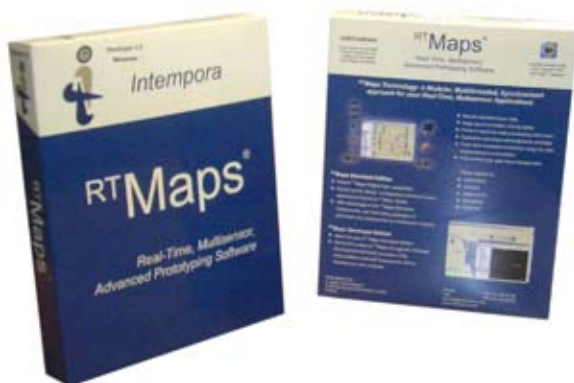
^{RT}Maps, a responsible and durable choice,
an opening towards new projects and a renewed effectiveness...

More Informations

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Test ^{RT}Maps Version 3…