



*"INtime® Software's seamless integration with Windows\* allows our customers to focus on developing their applications in a familiar programming environment."*

# Motion Control Platform Leverages Enterprise Technology with TenAsys® INtime®

Hardware partitioning makes system consolidation possible.

When Robotic Systems Integration (RSI) wanted to migrate analog servo controls into its digital robotics platform, it turned to TenAsys®. What they discovered was a platform that delivered high precision on standard PC hardware, streamlined development for its customers, and opened up a world of converged IT/OT solutions. The result was a less complex yet more-capable platform.

tenAsys®

RSI of Chicago, Illinois is one of the leaders in PC-based motion controls technology with its RapidCode API. The company's soft motion controller is used by OEM machine builders in industries such as medical, electronics, manufacturing, surgical robots, material cutting, semiconductor packaging, military, and aerospace applications.

The company is best known for its RMP EtherCAT\* Motion Controller, an EtherCAT soft motion controller tailored for OEM machine builders. With this platform developers can craft machine control applications using their preferred programming languages, including C++, C#, and Python.

The capabilities of RMP are built on a long history of innovation. RSI solutions originally used analog motion controllers and an extensive cabling system. To arrive at its current soft motion controller, RSI first needed to transition from the analog controller to a digital software platform that was not only user-friendly but also supported by a robust development environment. Essential to this transition was the need for standard I/O interfaces compatible with devices like servo amplifiers and motion sensors. The motion software had to be adaptable, allowing for modifications such as the integration of additional motion axes or support for unique interface components.

### Step 1: Bring Analog Technology to the Digital Domain

In order to bring reliable real-time functionality to the PC platform, RSI selected the Intime® RTOS by TenAsys® Corporation. INtime can run alongside Windows\*, Linux, and other OSs, while still meeting the timing demands of high-performance multi-axis motion control. This capability enabled RSI to bring its legacy analog control technology into the digital domain without modifying their existing PC-based software.

INtime has been enhanced to make optimal use of the constantly evolving x86 hardware and software platforms, including providing ongoing support for the Microsoft\* Visual Studio\* development environment and INtime Software APIs to create Windows HMI and controller applications. Figure 1 shows the architecture of a typical motion system using RSI's software. In a typical deployment, the real-time portion of the system runs on one processor core while Windows, Linux, or other OSs runs on the remaining cores.

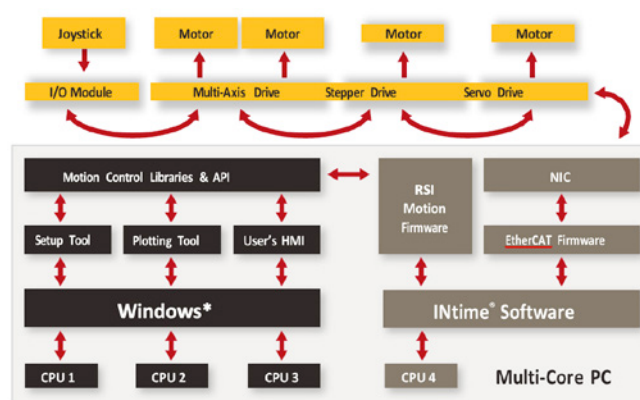


Figure 1. The PC-based motion system enabled by RSI and TenAsys® software runs motion tools and other standard Windows\* applications on some cores and the real-time motion runtime environment on a separate core.

### Step 2: Moving to a Modern Programming Model

After bringing its technology into the digital domain, the next challenge was enabling modern development methodologies. Here again INtime offered the company important advantages. "INtime uses technology developers already know," says Kim Hartman, Vice President of Marketing for TenAsys. "It works alongside Linux and Windows, integrates with popular tools, and supports popular programming languages, APIs, and libraries."

This approach is a perfect fit for RSI's goal of making development as quick and easy as possible. "Our motion library and all user application development uses standard Windows tools," said Raj Bhasin, Director of RSI. "INtime Software's seamless integration with Windows allows our customers to focus on developing their applications in a familiar programming environment." Customers have embraced this developer-first philosophy. "The package developed by RSI, especially the GUI is extremely well done and very user friendly," reports RSI customer Hunt Valve.

Just as important, the use of standard PC hardware opens the door to IT/OT convergence. For example, INtime is the leading Time-Sensitive Networking (TSN) RTOS, with a distributed version that runs on multiple physical or virtual hosts. This capability gives developers a jumpstart on creating edge-to-cloud networks that deliver the businesses intelligence needed to improve agility, enhance efficiency, and create new revenue streams. In short, RSI's innovations illustrate what's possible when diverse workloads are brought together on standard hardware: not only can companies solve today's challenges, they can also set themselves up for success in the fast-moving future.

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