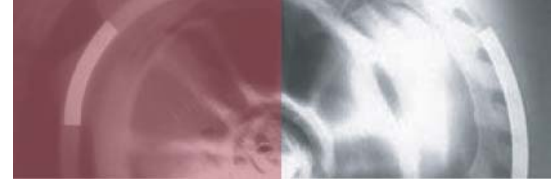




**White Paper**

**Case Study**



## **Agile Systems Assists Medica In Building An Optical Blood Cell Analyzer**

July 2006

## Challenge

At Medica Corporation, a team of engineers, with limited motion control experience, was challenged to build an optical blood cell analyzer in less than one year. The system required four-axes of motion, over fifty signals, and a high-speed network to handle the large amount of information that was streamed back to the host.

The prototype analyzer contained three-servo axis, a single stepper axis and many other auxiliary system components. The Z-axis utilized a voice-coil motor that was connected to an expensive linear amplifier to precisely position the inspection optics and camera.

The analyzer was built with a large remote cabinet; two motion controller architectures, three amplifier vendors, a custom I/O card and an abundance of wiring. The initial concept did not meet Medica's specification, as it was over budget, prone to failure, and exceeded allowable temperatures on the critical axis that positioned the camera and optics.

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## Solution

The main goals of Medica's engineering team were to simplify the system design and significantly reduce the cost of the analyzer. By working with Agile Systems, Medica's engineers were able to find a solution that exceeded their goals.

The first task was to simplify the system. When designing the analyzer the engineers tried many off-the-shelf, lower-cost PWM amplifiers in place of the expensive linear amplifier, however none could meet their positioning specifications. Engineers were convinced that the expensive linear amplifier was going to have to remain in the system, however the standard PWM amplifier in Agile's MAX3000 series exceeded their specification and quickly replaced the linear amplifier.

Since the MAX3000 size is only 3.5"X 5.5" for the motion controller and the four amplifiers, the engineers were able to place all of the system components inside of the analyzer, which eliminated the need for a remote cabinet and significantly reduced the complexity of their wiring harness.

The original custom I/O board designed by Medica needed to be reworked and their engineering team had a severe resource issue. The MAX3000 utilizes a modular design, which allows companies to add hardware and software functionality. Agile's engineering team, which specializes in designing cost effective digital and power electronics quickly, were up to the challenge. The result was a personalized daughter card that met all of Medica's input and output requirements and plugs into Agile's standard Max3000™ four-axis controller. In addition, three of these axes were servo, and one was a stepper, which reduced their need for additional controllers.

The teams worked together, minimizing the amount of code that was required, and created a simplified software solution. By taking advantage of Agile Systems software, [DP•Win™], analysis of vibration, speed, and power were done quickly and seamlessly.

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## Benefits

Since Agile Systems could control the servo and stepper motors with the MAX 3000, the engineers could simplify their system architecture, which encapsulated all of the motion control, amplifier, and I/O components. The engineers were able to use single software architecture and eliminate the need to learn separate software packages.

The program proved to be very successful, as the customer was able to save an estimated one person-year of development, and over \$10,000 per system in hardware costs.

As a result of the reduction in system complexity, the entire analyzer was built on a standard platform and enabled the customer to reduce their time to market by more than six months. This reduced their risk significantly, and will enable Medica to get their analyzer to the market faster.

## Product

The analyzer utilizes a Max3000™ four-axis controller, with a personalized daughter board.



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## About Medica Corporation

Medica uses its proprietary knowledge of ion-selective electrodes and analytical microchemistry to manufacture a line of easy-to-use and maintain low-cost blood analyzers. Medica is actively engaged in the development of new technology on which the company will base future analyzers with these same characteristics. The company's rapid growth is a result of strategic focus on the worldwide need to lower healthcare costs.

## Agile Systems

Agile Systems is a world leader in the design, development and manufacturing of advanced motion control technology including motor control and power conversion. Our team is highly skilled in integrating power electronics, digital controls and network communications into small, compact and cost effective packages.

WPC-002-05-01



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