ProductDesign and Development

InFocus

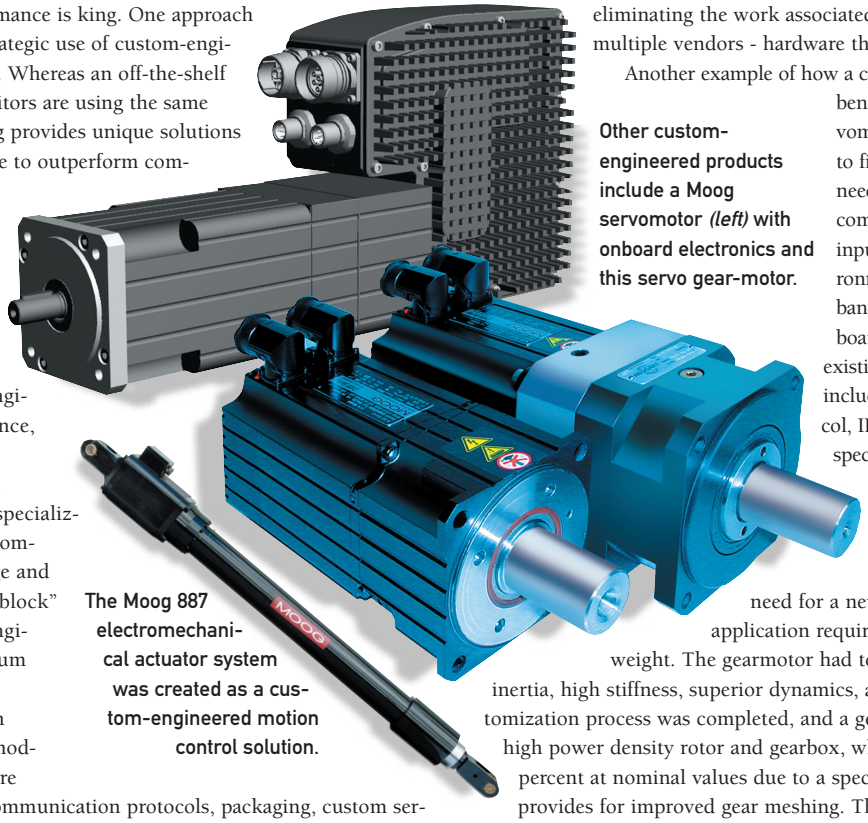
A Customizing Movement

Seeking better performance to set their motion control systems apart from the field, many companies are turning to customized solutions for help.

This article is from the National Fluid Power Association.
By R. Scott Scheffler

Design engineers are seeking new ways to create next generation machines with significant competitive advantages for their customers. Today's pace of innovation is so rapid that a 2 to 3 percent increase in machine throughput or efficiency can mean an enormous commercial success. This is especially true in the world of motion control where performance is king. One approach gaining momentum is the strategic use of custom-engineered products and systems. Whereas an off-the-shelf approach means that competitors are using the same products, custom engineering provides unique solutions that enable a specific machine to outperform competitive products.

There are many examples - we'll review some in the following paragraphs - of how custom-engineered solutions can benefit an application. The process works well when a design engineer provides size, performance, environmental, and connectivity/communication requirements to a company specializing in motion control. The company can apply its knowledge and customize proven "building block" products to create custom engineered solutions with optimum performance and cost.



Other custom-engineered products include a Moog servomotor *(left)* with onboard electronics and this servo gear-motor.

The Moog 887 electromechanical actuator system was created as a custom-engineered motion control solution.

These building blocks can include common electronic modules, processors, drive software with advanced algorithms, communication protocols, packaging, custom servomotor hardware, and gearmotors. The result can be an affordable solution that is also easy to implement.

One example involves a large manufacturer that needed a special capability for 2- and 8-axis control systems. It needed a high-performance multi-axis electric motion control as well as custom packaging/configuration and programmable update rates. Working with customization in mind, engineers created a specialty servocontroller built from basic building blocks with a fast Ethernet communications link, power electronics, multi-axis and stand-alone configurations, programmable input/output, environmental protections, and special diagnostics. All this functionality was delivered to the customer at the target price.

Electromechanical actuator systems represent another opportunity where a custom-engineered solution can offer significant performance advantages as well as such benefits as compactness and flexibility. There might be the need for high-performance multi-axis control, low energy costs, small package size, and reliability in heavy-duty applications. The solution might be a screw, servomotor, electromechanical hardware, and cables integrated and matched with a custom motor controller to create a high-performance, low-inertia system in a small package. This approach can save time and money by eliminating the work associated with integrating hardware from multiple vendors - hardware that is not entirely compatible.

Another example of how a custom approach can yield myriad benefits involves the request for a servomotor for a rotating machine. It had to fit a defined machine footprint. Also needed were special packaging and communications, universal power input, reduced machine wiring, environmental protections, and increased bandwidth. A servomotor with onboard electronics was developed from existing high-performance modules to include CANopen communication protocol, IP65 environmental protection, and special resolvers/encoders for optional feedback. This customized product was delivered in 16 weeks for machine trials.

A final example addresses the need for a new gearmotor for a robotic handling application requiring high power density and low weight. The gearmotor had to have a small package size, low inertia, high stiffness, superior dynamics, and high acceleration. The customization process was completed, and a gearmotor was developed with a high power density rotor and gearbox, which provides efficiencies up to 98 percent at nominal values due to a special manufacturing process that provides for improved gear meshing. The elimination of couplings also resulted in a smaller overall length and weight and higher throughputs.

In all these cases, custom-engineered motion control products turned out to be the most cost-effective solution for industry-leading performance.

*R. Scott Scheffler is senior applications engineer for Moog Inc.'s North American Drives Group. More information is available by contacting the company directly at 300 Jamison Rd., East Aurora, NY 14052, calling (716) 687-5581, writing in **41** on our reader service card, visiting www.moog.com/industrial, or replying online at www.pddnet.com.*

MOOG