

How electro-mechanical actuation is reshaping modern aerospace

29 July 2026

The aerospace sector is undergoing a shift. As platforms across commercial aviation, defense, and emerging advanced air mobility (AAM) applications evolve, one technology is becoming increasingly central to their design: electro-mechanical actuation.

For decades, hydraulic systems have been the backbone of aircraft motion control, powering everything from flight surfaces to braking systems. Today, however, that dominance is being challenged. Electrification is not only changing how aircraft are powered, but also how motion is generated, controlled, and integrated across the airframe.

From electric vertical take-off and landing (eVTOL) aircraft to next-generation defense platforms and guided munitions, electro-mechanical actuators are playing a growing role in enabling lighter, more efficient, and more adaptable systems.

A shift away from the traditional

This move toward electro-mechanical actuation is driven by a combination of factors, including performance, efficiency, and a broader architectural change.

Traditional hydraulic systems are effective, but they come with inherent drawbacks. They require complex infrastructure, including pumps, fluid lines, and reservoirs, all of which add weight and introduce potential points of failure. Maintenance demands are also high, with ever-present risks of leakage and contamination.

Electro-mechanical systems offer a viable alternative. By replacing fluid power with electrically driven motion, they eliminate the need for much of this supporting infrastructure. The result is a more compact, modular approach to actuation that aligns with the broader electrification of aircraft systems.

Weight reduction is a particularly critical factor in this, especially in fully electric aircraft. Here, energy storage is constrained by battery technology, meaning that every kilogram saved has a direct impact on range and performance. Removing hydraulic systems can significantly reduce overall system weight, while also simplifying integration across the platform.

As a result, once an aircraft begins the transition toward electrification, the shift to electro-mechanical actuation often gains momentum. Rather than maintaining a hybrid architecture, designers are increasingly looking to extend electrical systems throughout the aircraft to maximize efficiency and minimize complexity.

A common set of engineering challenges

While the applications of electro-mechanical actuation are diverse, the underlying engineering challenges are remarkably consistent.

Across both commercial and defense aerospace, engineers must optimize for size, weight, and power (SWaP). Actuation systems must deliver high power density within extremely constrained envelopes, often while operating in harsh environments that include extreme temperatures, vibration, and mechanical shock.

“In aerospace, every design decision is a balancing act,” explains Julian Del Campo, Director of Business Development at Regal Rexnord. “The challenge is to deliver the required performance while minimizing weight and space. At the same time, however, we must still ensure the system can withstand the challenging conditions it will face in operation.”

These challenges are particularly pertinent in emerging aerospace applications. eVTOL aircraft, for example, rely on distributed actuation systems across multiple rotors and control surfaces, increasing the number of actuators required while maintaining strict SWaP constraints. On the defense side of things, systems such as unmanned aerial vehicles (UAVs) and guided munitions demand compact, high-response actuation solutions capable of operating reliably in extreme conditions.

Despite these differences in application, the core requirement remains the same: highly optimized electro-mechanical systems that deliver consistent, precise performance.

From components to systems

As actuation technology becomes more central to aircraft performance, the way it is specified and supplied is also evolving.

Historically, aerospace OEMs have sourced individual components, such as motors, gearheads, brakes, and sensors, from multiple suppliers and integrated them into a complete system in-house. While this approach offers flexibility, it also introduces complexity. Each component must be validated independently, and interactions between components can create unforeseen challenges during testing and certification.

Today, there is a growing shift toward more integrated solutions.

For example, rather than just supplying discrete parts, **Regal Rexnord Aerospace Solutions** can deliver complete electro-mechanical actuation subsystems, designed and optimized as a cohesive unit. This approach allows for tighter integration between components, improving overall performance.

It also simplifies the development process. By dealing with a single supplier rather than a dozen or more, communication becomes more streamlined, and design changes can be implemented more quickly. This is particularly valuable in fast-moving programs such as AAM, where development timelines are significantly shorter than the multi-year timeframes seen in traditional aerospace.

The importance of expertise and experience

Alongside integration, there is an increasing emphasis on working with suppliers that bring deep domain expertise.

Aerospace remains one of the most demanding engineering environments, with stringent requirements around safety, reliability, and certification. Components must not only perform as intended, but do so consistently over long service lives and under challenging conditions.

This places a premium on experience. A supplier with a long track record in aerospace is often better positioned to anticipate potential issues, design for certification from the outset, and support customers through the validation process.

“There is a growing recognition that expertise matters just as much as technology,” says Del Campo “OEMs are looking for partners who understand the application, the regulatory environment, and the realities of bringing a system to flight.”

This is particularly relevant as new entrants enter the aerospace market. Many AAM developers, for example, are adopting rapid development approaches inspired by other industries. While this accelerates innovation, it also increases the need for partners, such as Regal Rexnord, who can provide proven solutions and help navigate the complexities of aerospace certification.

Enabling the next generation of flight

As aerospace continues to evolve, electro-mechanical actuation is set to play an increasingly central role.

Suppliers such as **Regal Rexnord Aerospace Solutions** are responding to this shift by combining decades of aerospace engineering experience with a broad portfolio of motion and control technologies. By bringing together motors, gear systems, brakes, and actuation components within a single organization, they are able to support the development of fully integrated electro-mechanical solutions tailored to specific applications.

For aerospace OEMs navigating an increasingly complex landscape, this combination of technological capability and engineering expertise is more important than ever.

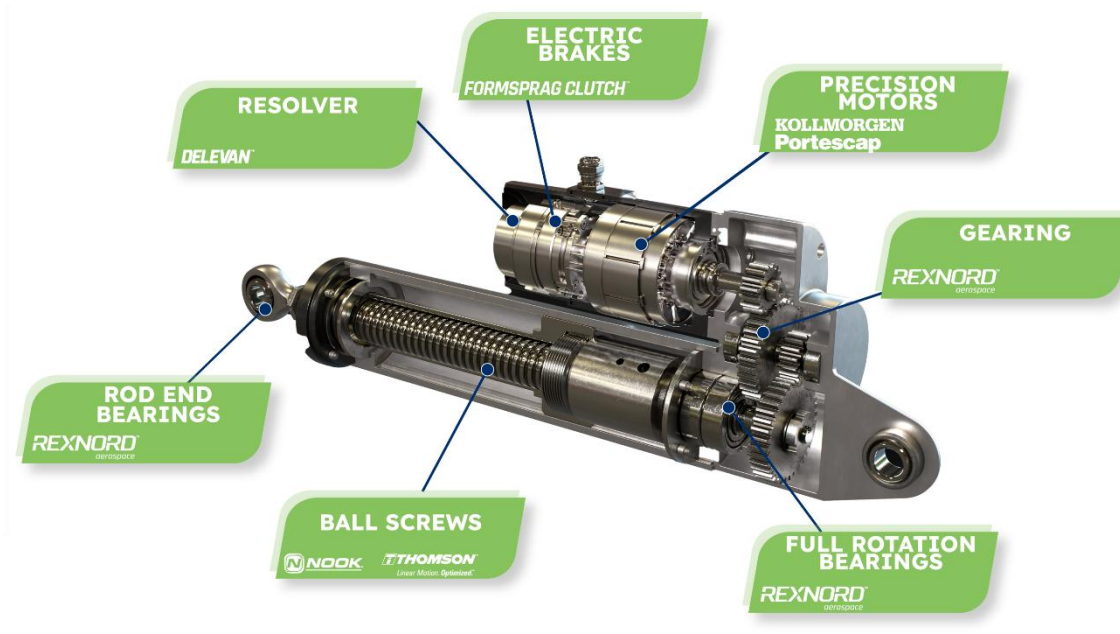
Image captions:

Image 1: Regal Rexnord Aerospace Solutions can deliver complete electro-mechanical actuation subsystems, designed and optimized as a cohesive unit.

The image(s) distributed with this press release are for Editorial use only and are subject to copyright. The image(s) may only be used to accompany the press release mentioned here, no other use is permitted.

About Regal Rexnord

Regal Rexnord's 30,000 associates around the world help create a better tomorrow by providing sustainable solutions that power, transmit and control motion. The Company's electric motors and air moving subsystems provide the power to create motion. A portfolio of highly engineered power transmission components and subsystems efficiently transmits motion to power industrial applications. The Company's automation offering, comprised of controllers, drives, precision motors, and actuators, controls motion in applications ranging from factory automation to precision tools used in surgical applications.

The Company's end markets benefit from meaningful secular demand tailwinds, and include discrete automation, food & beverage, aerospace, medical, data center, energy, residential and commercial buildings, general industrial, and metals and mining.

Regal Rexnord is comprised of three operating segments: Industrial Powertrain Solutions, Power Efficiency Solutions, and Automation & Motion Control. Regal Rexnord is headquartered in Milwaukee, Wisconsin and has manufacturing, sales and service facilities worldwide. For more information, including a copy of our Sustainability Report, visit [RegalRexnord.com](https://www.RegalRexnord.com).

Press Contact:

Regal Rexnord Corporation: Jenna Zembrowski, PR and Content Lead

Email: mediarelations@regalrexnord.com

Web: RegalRexnord.com

PR Agency:

DMA Europa Ltd: Zoe Taylor, Account Manager

Progress House, Great Western Avenue, Worcester, WR5 1AQ, UK

Tel.: +44 (0) 1905 917477

Email: zoe.taylor@markettechgroup.com

Web: news.dmaeuropa.com