



PGM Reball: advancing precision motion for the next generation of space systems

Deep within the UK's advanced manufacturing landscape, Midlands-based PGM Reball has built a reputation for engineering excellence across the aerospace and defence supply chain. Today, through innovation and strategic support from the UK Space Agency's Space Ecosystem Commercialisation Programme (SECP), the company is taking its expertise to new heights – developing next-generation components designed for the extreme demands of space.

Engineering motion at the highest level

At the heart of PGM Reball's work is the ballscrew – a precision-engineered component responsible for converting rotational motion into linear movement. While often unseen, ballscrews play a critical role in both aerospace and space systems. From adjusting antenna positioning and deploying solar panels on satellites, to controlling thrust direction in rocket launchers, their reliability is mission-critical.

Traditionally, PGM Reball's components have been deployed across missiles and aircraft. However, in recent years the company has successfully pivoted into the space sector, producing a very small and accurate ballscrew for a telecoms satellite, as well as developing a prototype for the vector control system of a rocket launcher.

Overcoming the challenges of space environments

Operating in space introduces a unique set of engineering challenges: ballscrews must withstand extreme vibration during launch, extreme temperature changes, radiation exposure, and the vacuum of space – all while maintaining absolute precision.

One of the most significant risks lies in the recirculation mechanism within the ballscrew assembly. Under stress, this mechanism can become dislodged, leading to immediate failure. For mission-critical systems, this represents a major reliability concern.

To address this, PGM Reball is developing an innovative design that unifies the recirculation insert with the ball nut body. In doing so, they hope to eliminate any failure due to vibration – whilst also enhancing performance across temperature extremes.

Pushing the limits of miniature manufacturing

Miniaturisation introduces an additional layer of complexity. At very small scales, it's impossible to create the intricate internal thread structures within a ball nut using traditional machining techniques. PGM Reball's solution is 3D printing, which allows them to 3D print the ball nut with the correct internal pattern.

Support from the UK Space Agency's SECP programme has enabled PGM Reball to accelerate this innovation, de-risking one of the most challenging and costly phases of development.

The company was able to 3D print components to exceptional tolerances, achieving zero porosity in the material structure – a breakthrough that significantly reduces the need for post-processing and enhances the structural integrity of the final component. They now have a patent pending for this innovative concept.

Strengthening the UK space supply chain

PGM Reball's innovation has implications beyond a single component. By developing a patented design that can only be manufactured within the UK, the company is contributing to a more resilient and sovereign space supply chain.

Their participation in SECP has also opened new doors commercially, enabling collaboration with new suppliers and generating strong interest from both the space and defence sectors.

Looking ahead

With promising test results in hand, PGM Reball is now focused on completing further validation and benchmarking their alternative printing method. The next phase will involve moving from controlled testing environments to real-world applications – an important step toward full commercialisation.

By reimagining a fundamental component and pushing the boundaries of manufacturing, PGM Reball is helping to power the next generation of reliable, high-performance space systems – supporting growth not just within the Midlands, but across the entire UK space ecosystem.