



With its extensive offering of thin section ball bearings, AST helped two manufacturers of wall monitor arms used in healthcare applications achieve more reliable positioning and more durable mechanisms.

Healthcare facilities turn to pivoting and articulating “arms” to hold monitors, and other equipment used in operating rooms, patient hospital rooms and dental offices, among other venues. The arms provide ergonomic advantages but more importantly, they remain functional where space is at a premium. In the operating theater, for instance, a surgeon can simply grab the monitor and move it; the monitor remains where it was last positioned. The monitor, or display, is then pushed back reclaiming the space.

#### One of the world's leading suppliers of medical equipment...

That's the ideal scenario, of course. However, for one manufacturer of these arms, who was modifying an existing arm design in order to hold more weight – two monitors, a problem arose: Heavier loads resulted in erratic, non-repeatable movement of the arms, and caused them to drift and sink out of position when at rest. “It made it very hard for the doctors and nurses to move the arm, and position the display for optimum viewing,” said Jeff Fergus, Chief Applications Engineer of AST.

The existing setup was using sliding bearings, which worked adequately when tasked with light loads. But for these heavier loads, especially for arms that have multiple pivot points, movement became imprecise and unpredictable – both unacceptable conditions in an operating room, surgical suite, or other clinical environment where they need to focus on patient care.

AST engineers got to work, evaluating performance and life requirements. Movement consistency and repeatability were key, even after thousands of movements. In fact, the manufacturer insisted that the design life should exceed 10 years. Additionally, and perhaps the greatest challenge, the re-design criteria established by the manufacturer did not allow for changes to any of the existing components used in the arm assembly. Only minor modifications were permitted; ones that did not require new tooling or changes in the supply chain.

With the load, operating conditions and general dimensions somewhat fixed, AST arrived at a solution: thin section ball bearings with a full complement of balls, or an airframe control bearing. These bearings were ideally suited for the duty cycle experienced by the wall mount arms – highly repetitive combined with a relatively short range of movement.

With their thinner cross section than a single row, deep groove ball bearing, thin section ball bearings are ideally suited for applications with space restrictions – such as on mounts or articulating arms. “With their thin cross section, the bearings can have a large outer diameter and a somewhat larger inner diameter, too,” Fergus said. “So, you can pass wires or mechanical components through their center.” For articulating or robotic arms, the thin section bearings allow you to run wires or fiber optics from a central processor to a remote device on the end of the arm with minimal obstruction.”

Thin section ball bearings are designed for applications where low friction and high accuracy are required and where space is at a premium. The airframe type selected are used when loading is predominantly in the radial direction. However, they can also support limited axial (one direction) and reversing loads. These attributes made the bearings especially suitable for the manufacturer of the monitor arms.

“The larger size of the bearing with the thin section and full complement of balls allows us to carry the weight,” Fergus said. “Once we determined the bearing size and proper pre-load, we developed a prototype concept where we simply modified the bearing mounting surfaces at the end of the arms. And, as each joint had [typically] two bearings, that provided the necessary stiffness and stability.”

AST offers nearly 300 different types of thin section ball bearings, organized into the following series:

- **SR (formerly our E Series) series:** Inch dimensional series with bore sizes ranging from 3/8-inch to 1 5/8-inches.
- **Torque Tube Series:** Inch dimensional series with bore sizes ranging from 5/8-inch to 2 5/16-inches. (for non-military/aircraft applications without cadmium plating)
- **6700 series:** Metric dimensional series for very limited space applications and very light loads
- **6800 series:** Metric dimensional series for limited space applications and light loads
- **63800 series:** A hybrid between the 6800 and 6900 series that includes the load capacities of the 6800 series and the width of the 6900 series
- **6900 series:** Metric dimensional series for limited space applications and heavier loads





*With its extensive offering of thin section ball bearings, AST helped two manufacturers of wall monitor arms used in healthcare applications achieve more reliable positioning and more durable mechanisms.*

*The following is part two of a two-part post. Read part one [HERE](#).*

#### **An innovative mid-size company...**

Again, seeking to redesign an existing product, a modified setup was applied to a second manufacturer whose monitor arm was required to hold two monitors with a light at its endpoint. "They had an existing lighting system in the operating room, and they needed to introduce a brighter light — a fixture with additional light heads attached," Fergus said.

Eliminating shadows was paramount, which required the ability to precisely position the arm. But with the additional lights and weight, the load was too heavy for its existing arm.

AST engineers again recommended thin section ball bearings. Its 6700 series assemblies are exceptionally thin, the ideal configuration for the existing arms and its dimensional constraints (the manufacturer was unwilling to redesign the monitor arm).

#### **Testing, one, two, three**

After exhaustive testing for both clients, the thin section bearings proved successful and durable. "Testing was critical because the healthcare settings required thousands of cycles," Fergus said. "It's extremely expensive to make a service call into a surgical room or hospital."

#### **Innovative Thinking. Innovative Solution.**

AST offers a complete line of thin section bearings and the engineering expertise to specify and apply them correctly.

For AST, it's not always about steering a client to an existing product; rather, it's finding a solution that solves a unique challenge that is the distinguishing AST value proposition. And it's this ability and willingness to assess a problem and consider customer requirements (and limitations) before developing a solution that distinguishes AST as an industry leader in ball bearing technology.

AST has developed a global network of partner manufacturers who will produce customized designs —unusual in the industry — ensuring the optimal performance of its customers' products.

