Zeeko Limited is a business that thrives on difficult challenges imposed by its global customers – so much so, its business model is based around being first to market with innovative polishing solutions using its Ultra-Precision Polishing Machines. FANUC UK is a core supplier of control systems to Zeeko and is playing a significant part in assuring that the difficult challenges are met.

The Ultra-Precision Polishing Machines, known as Intelligent Robotic Polishers (IRP), are used in the production of surfaces requiring nanometre accuracy. These include telescope mirrors from a few millimetres across to several metres and in particular to 1.4 metre segments of ‘The European Extremely Large Telescope project’ (E-ELT) which at a finished diameter of 42 metres will be the world’s largest ‘Eye on the Sky’.

Winning a Queens Award for Innovation for its ‘Optics Fabrication Centre’, a 1200mm IRP with integrated interferometer, Zeeko works closely with FANUC from the design and concept phase specifying the resolutions required to measure down to nanometre levels. Dr David Loke, Machine Control Systems Manager, Zeeko, explained, “We are not as knowledgeable as FANUC about their controllers so at an early stage we meet to see what is available and what is needed. From these meetings we are able to specify control systems, motors and drive kits.

Using a bonnet or slurry jet polishing system to produce form as well as texture, Zeeko IRP machines remove nano-metric levels of material to achieve the desired results. The innovative addition of an interferometer to its new 1200 Machine removes the need to take components off the machine for measurement during the polishing process. This eliminates errors in exact replication of positioning on the machine as measurement takes place in-situ.

FANUC played a key part in providing control for the five axes polishing arm and the interferometer working closely with Zeeko’s development team, explains Dr Loke, “We have two encoders per axis, back checking each other, resolving down to nanometric levels and we clearly understand that you can use the best encoders available but without an excellent controller the system falls down; it’s a combination of the two that is essential.

“With the integrated interferometer there’s a lot of mathematics going on, pictures are taken of different segments of the component being polished to tell the system what state the component is in; this information is plotted against what is required and an error map is fed into Zeeko Precessions software which creates a corrective toolpath on the FANUC controller.”

In addition to its well established optics markets, the process has opened up significant opportunities for Zeeko in the medical sector where the polisher is able to replicate complex human joints, such as the knee, to help produce highly sophisticated prosthetics. Zeeko machines are being used globally in applications including semi-conductor, camera lens production and injection mould tooling.

FANUC’s global support is a key factor in the supply partnership with Zeeko concluded Dr Loke, “We’ve had several instances where overseas customers have required additional functions that require control features and extensions being switched on. In every instance FANUC has been able to provide a seamless highly knowledgeable level of support which adds considerable value to the Zeeko Brand.”
Notes to editors:

**FANUC UK** provides industrial automation solutions from the supply of CNC controllers, robots, drilling machines, EDM and injection moulding machines through to the complete integration of factory automation systems. Providing a single customer support portal for its three core businesses, FANUC UK comprises FA – CNC Controllers, motors and drives, Robotics – industrial robots and systems, Robomachines – EDM, Injection Moulding, drilling machines.

**FANUC Corporation** is a world leading manufacturer of Factory Automation (FA), robots and Robomachines. Since its inception in 1956, FANUC has contributed to the automation of machine tools as a pioneer in the development of computer numerical control equipment. FANUC technology has contributed to a worldwide manufacturing revolution, which evolved from the automation of a single piece of machinery to the automation of entire production lines.

**FANUC** employs 6,500 people worldwide. Based at the foot of Mt Fuji, near Lake Yamanaka, FANUC's factory uses over 2,000 FANUC robots to support a monthly production capacity of 30,000 CNC controllers, 5,000 robots, 250,000 servo and spindle motors and 5,000 robomachines and 250 CO2 lasers.