Out-of-this world outcome for AAO technology team

World leading technology developed by the Australian Astronomical Observatory’s (AAO) instrumentation team will be used on a new astronomical research instrument being developed for one of the world’s most advanced telescopes.

The AAO technology is critical and cannot be sourced elsewhere.

The European Southern Observatory, one of the world’s pre-eminent astronomy research bodies, recently signed an agreement with the 4MOST consortium, which includes the AAO, to build the new instrument on the VISTA Telescope located at the Paranal Observatory high in the Atacama desert of Chile.

The instrument is expected to examine 75 million stars or galaxies over its lifetime and conducting research that will significantly advance our understanding of dark matter and galaxy formation, particularly the events that formed out Milky Way galaxy.

The instrument, known as 4MOST (the 4-metre Multi-Object Spectroscopic Telescope), will feature positioner technology developed by the AAO called AESOP.

The AAO’s AESOP system will position fibres 2,400 fibres in two minutes, which is 120 times faster than the existing positioning robot technology at AAT. Importantly, AESOP works in parallel, so its rapid positioning time is independent of the number of fibres.

AESOP is based on patented AAO technology, known as Echidna for its spiny appearance, that was installed on Japan’s 8-metre Subaru telescope in Hawaii and is destined to be developed for use on the Giant Magellan Telescope, scheduled to begin operation Chile in 2025.

The adoption of Australian positioning technology is extremely exciting for Australian astronomy because it recognises our high degree of innovation and international engagement.

It will also mean the AAO will be able to nominate eight Australian astronomers and their teams to participate in any of the surveys using the 4MOST instrument. In addition, Australia will be entitled to lead one 4MOST Consortium Survey, WAVES (lead by Simon Driver of UWA), to study 2 million galaxies to better understand dark matter and galaxy formation. Australia is the only one of the 13 international partners in the 4MOST consortium that is not a European Southern Observatory member.
CASE STUDY: the Australia ESO fibre Positioner (AESOP) for 4MOST

The Instrumentation Group at the AAO is developing the AESOP instrument for a major international consortium called 4MOST, which reports to the European Southern Observatory (ESO). 4MOST seeks to upgrade the 4-m VISTA telescope in Chile with a revolutionary, massively multiplexed spectroscopic capability. The AESOP positioner is based on the AAO’s patented ‘Echidna’ fibre-positioning technology, which has been deployed at Japan’s 8-m Subaru telescope in Hawai’i. Because the AAO is providing a critical technology that cannot be sourced elsewhere, Australia is the only one of the 13 international partners in this consortium that is not an ESO member. This is an example of AAO technology launching Australia into the world-science arena in a way that would be impossible without its high degree of innovation and international engagement.

Caption: A schematic of the 4-metre VISTA telescope showing the location of the AAO’s AESOP Fibre Positioner (Credit: Nick Staszak/AAO).