

The European Southern Observatory and EIE

By Prof. T. De Zeeuw – Present ESO DG

The European Southern Observatory (ESO) has worked with EIE on many occasions over the past decades. In fact, our relationship dates back to before the establishment of EIE in its current form on 2 November 1989, the 25th anniversary of which we are now celebrating.

Earlier that year, on 23 March 1989, ESO achieved First Light with the New Technology Telescope (NTT) on the 2400-metre-high mountain of La Silla in Chile. As its name suggests, the NTT introduced revolutionary new astronomical technologies. It looked like no telescope that had gone before it, due in large part to its unusual octagonal enclosure, whose angular lines were a dramatic departure from the traditional rounded domes of previous telescopes. The enclosure was built by the CRIV consortium, which included the team who went on to form EIE. Its design was compact, with ventilation flaps to make air flow smoothly across the telescope mirror, reducing turbulence and leading to sharper images.

The NTT paved the way for ESO's flagship, the Very Large Telescope (VLT) on the 2600-metre-high Cerro Paranal, also in Chile. EIE was part of the AES consortium, which was awarded a contract in 1991 to provide major parts of the VLT's four 8.2-metre-diameter Unit Telescopes: all the steel structures, the hydrostatic bearings on which these heavy structures would rest, direct-drive motors to move the telescopes and high-precision encoders to measure their exact position. EIE was also a member of the SEBIS consortium, which was awarded the contract to build the enclosures for these four giant telescopes.

Around the turn of the millennium, ESO began work on the Atacama Large Millimeter/submillimeter Array (ALMA), in collaboration with North America and East Asia—the largest ground-based astronomical project in existence. ALMA observes light with wavelengths around one millimetre, and so is very different from optical-infrared telescopes such as the NTT and VLT. It comprises an array of 66 high-precision dish-shaped antennas on the 5000-metre-high Chajnantor plateau in the Chilean Andes.

EIE — as part of the AEM consortium — was selected by ESO to produce 25 of the antennas for ALMA. This 147 million euro contract, signed on 7 December 2005, was the largest ever awarded in ground-based astronomy in Europe. The antennas' innovative design makes extensive use of carbon fibre, and direct-drive motors similar to those for the NTT and VLT. The 12-metre-diameter antenna shave surfaces which are accurate to much less than the thickness of a single sheet of paper, and can be pointed accurately enough to pick out a golf ball at a distance of 15 kilometres. They achieve this feat without the protection of an enclosure, in the harsh high-altitude conditions of Chajnantor, with strong winds, intense sunlight, temperatures between +20 and -20 Celsius, and even snow.

EIE has specialised in astronomical engineering, and it is of great help for ESO to have a partner who really “speaks our language” as we design and build some of the most advanced astronomical telescopes in the world. It has been a pleasure to work with EIE on not only these projects but others, for both present and future telescopes. I am very happy to congratulate EIE on its 25th anniversary, and wish you all the best for the next 25 years!