

EIE and Arizona: The Large Binocular Telescope Project and the ALMA Prototype Antenna

By Prof. P. Strittmatter

This year EIE celebrates not only its 25th birthday but also a remarkable record of achievement for such a young organization. During this same period Astronomy has completed a major revolution in observational capability, including the LBT – currently the world's largest single O/IR telescope - the VLT and ALMA. EIE has played a key role in each of them.

My own involvement with EIE began with the LBT project (see contribution by John Hill), which started life around 1985 as the Columbus Project - a collaboration between the Osservatorio Astronomico di Arcetri (OAA) and three US universities, Arizona (UA), Chicago and Ohio State (OSU). The impetus came from three considerations namely: (i) the success of the Multi-Mirror Telescope had shown that much larger and more powerful telescopes could be built at reasonable cost using segmented apertures; (ii) the promise of the honeycomb mirror technology being developed by Roger Angel and colleagues at the Arizona Mirror Lab; and (iii) the scientific cost effectiveness of the 2 x 1 configuration. Feasibility studies were carried out from 1986/89 with a positive outcome and authorization to proceed with the Mt. Graham International Observatory was given by the U.S. Congress in 1988.

There followed a period of some uncertainty until 1992 when the Columbus Corporation (later renamed the LBT Corporation) was formed with partners OAA, UA and the Research Corporation (RC); John Schaefer (RC) served as chair, John Hill as Project Director and Piero Salinari as Deputy Director. It had been agreed from the outset that the primary optics would be fabricated by the UA Mirror Lab and that responsibility for the telescope mount would be Italy's under the leadership of OAA. From 1993 onward, work on mount and enclosure design proceeded with major involvement of EIE (Mestre), ADS (Lecco), M3 (Tucson) and several other contributors on both sides of the Atlantic, all coordinated by the Project Offices in Arcetri and Tucson. Site clearing occurred in December 1993 but further action was delayed by legal concerns about the precise telescope location until clarified in 1996 by the U.S. Congress. The delay was exploited by the Project to re-optimize the optical support structure of the mount, including the incorporation of swing arms to enable rapid changes in optical configuration to take advantage of varying observing conditions. In 1997, OSU and the LBT Beteiligungsgesellschaft (a German consortium) joined the LBT Corporation thereby ensuring the resources needed to complete and operate the telescope. Construction of the mount went full steam ahead in Italy culminating in the shipment of the mount to Arizona in 2002.

Throughout this period, EIE played a key role in the LBT project. Under the leadership of Gianpietro Marchiori, EIE made key contributions to design optimization, undertook the detailed design and produced the final construction specifications and drawings. During the mount fabrication at the Ansaldo factory in Milan, EIE monitored and guided progress on behalf of the LBT Corporation and steered a complex path between the conflicting project schedules at that plant. These efforts culminated in the successful assembly and testing of the mount at the Ansaldo plant in late 2001, followed by its disassembly and shipping to Arizona in 2002. The mount is shown at left following its assembly in the LBT enclosure in 2003. Throughout this entire development, EIE displayed a remarkable ability to understand the needs of the astronomers and mesh them with the realities of the companies involved in bringing the project to fruition. EIE can be very proud of its contributions to the LBT – currently not only the world's most powerful single telescope but, with its 23m baseline, arguably the first of the next generation of Extremely Large Telescopes. Certainly those contributions were and still are much appreciated by the LBT partners.



telescope dome on Kitt Peak, saw first light on Kitt Peak in mid-September 2014 and is now undertaking routine scientific observations with the system.

Most recently UA has enjoyed further positive interactions with EIE on another astronomical project. In March 2013, the European Southern Observatory formally transferred ownership of the Alcatel EIE Consortium (AEC) ALMA Prototype Antenna (APA) to UA, with the understanding that UA move the APA from New Mexico to Kitt Peak Arizona and make observing time available to ESO astronomers. EIE played a critical and very helpful role not only in facilitating the transfer agreement but also in providing early key advice to the UA's Arizona Radio Observatory in regard to the disassembly, transport and re-assembly of the antenna. With that assistance, the APA, shown above in its new home in the 12m original NRAO

In summary, UA appreciates the very helpful and constructive interactions it has had with EIE with regard to the LBT and APA projects and looks forward to continued collaborations with EIE over the next quarter century.

Happy 25th Birthday EIE - from all you friends in Arizona.