

EIE and the “Large Binocular Telescope”

By Prof. Piero Salinari

The LBT project was peculiar from its beginning for many technical aspects: it was the first Fizeau interferometer, therefore made of two parallel telescopes on a single mount, with very fast, very fragile honeycomb primary mirrors (requiring very tight optical and mechanical tolerances), with Adaptive Optics integrated in the telescope secondary mirrors . . . But even more peculiar was the available budget: approximately one half, per unit collecting area, than that of the other large telescopes of the same generation.

The preliminary studies of the LBT Project Office had demonstrated the technical feasibility of the project, but the real challenge was faced in 1997, when new partners (the German LBTB and the Ohio State University) joined those who had started the project (University of Arizona and Italy) and it became possible to start constructing the telescope. The budget made available by the partners for this ambitious project was in total 63.5 M\$. Moreover Italy needed to spend its contribution (one quarter of the budget) in Italy, but there was no “fear return” clause in the partner agreement; it was required for any construction contract to go through international competitive bids.

EIE, thanks to its previous role in the design and construction of large telescopes (TNG, NTT and VLT) had the first and crucial contract for the construction design of the telescope and of the enclosure. The EIE job was not limited to translate in a single coherent design (respecting the very tight tolerances) the basic choices made by the LBT Project Office for the structure and for the main components of the Telescope and of the enclosure, but consisted largely in identifying the most competitive construction technologies available in the Italian industry, with the double objective of reducing the construction cost and of increasing the probability of success of the Italian companies in the international bids.

This first contract with EIE was the key for the success of the entire project: the EIE design of the telescope and enclosure was totally successful on both fronts, technical and financial. The severe technical performances of the Telescope have been fully achieved within the tight budget limits and essentially the entire telescope construction was done by Italian companies. Even a large fraction of the Enclosure, which for the regulations of the State of Arizona could only be erected by an Arizonian company, was built in Italy at a highly competitive cost (rails, boogies, cranes).

In addition to the excellent design work, in the LBT construction EIE has demonstrated a unique knowledge of the Italian industrial environment and the capability of fully exploiting its most competitive areas: all the international competitive bids (about twenty) concerning the mechanical parts of telescope and enclosure have been won by Italian companies offering the best performances at the lowest price.

The role of EIE in LBT was not limited to the design. EIE had also the role of following the construction of all the mechanical components, their acceptance procedures, the pre-assembly in the factory, the transportation and the re-assembly on the Mt. Graham site.

In practice, in the period between 1997 and 2004 (inauguration of LBT) EIE acted as a component of the Project Office in daily close interaction with the Italian and US members of the PO. The splendid collaboration, established for the construction of LBT, among researchers of different countries and an engineering company (EIE, acting also as an interface with the manufacturing industry) represents, in my opinion, an example worth following for both sides of large scientific projects: researchers and industry.