Th'ESObservatoire: merging La Silla and Paranal Observatories

Roberto Gilmozzi and Jorge Melnick (ESO)

The scientific role of La Silla beyond 2006 was assessed by a working group composed of members of the STC, of the UC and of ESO, and chaired by Andrea Cimatti. Their "*La Silla 2006+*" report is available through the ESO web (www.eso.org). The main conclusion of the report is that "*…. the La Silla observatory will still be a crucial component of the ESO facilities and will be a fundamental ESO component to perform world-class scientific research for European astronomers*". The report recommends that La Silla continues to operate beyond 2006 with only two telescopes: the NTT and the 3.6m.

The working group also examined the scientific productivity of La Silla in terms of publications and citations (these data are available in the report). Figure 1 presents a comparison of the productivity of La Silla with other major observatories compiled by Uta Grothkopf. La Silla is seen to be one of

Table 1: Operational costs of telescopes in the OPTICON/FP6 proposal

Installation	Telescope name	Country	Cost in Euros	Per
3.9m Tel	AAT	UK	7331	Night
3.5m Tel	CAHA 3.5m	D	7796	Night
2.2m Tel	CAHA 2.2m	D	2925	Night
3.6m Tel	CFHT	F	13895	Night
3.6m Tel	ESO-3.6	INT	6631	Night
3.5m Tel	ESO-NTT	INT	7296	Night
2.2m Tel	ESO/MPG-2.2	INT	2654	Night
4.2m Tel	WHT	UK	10727	Night
2.5m Tel	INT	UK	1999	Night
3.8m Tel	UKIRT	UK	926	Hour
3.5m Tel	TNG	I	7326	Night
2.5m Tel	NOT	INT	3745	Night
2.5m Tel	Aristarchos	Gr	1973	Night

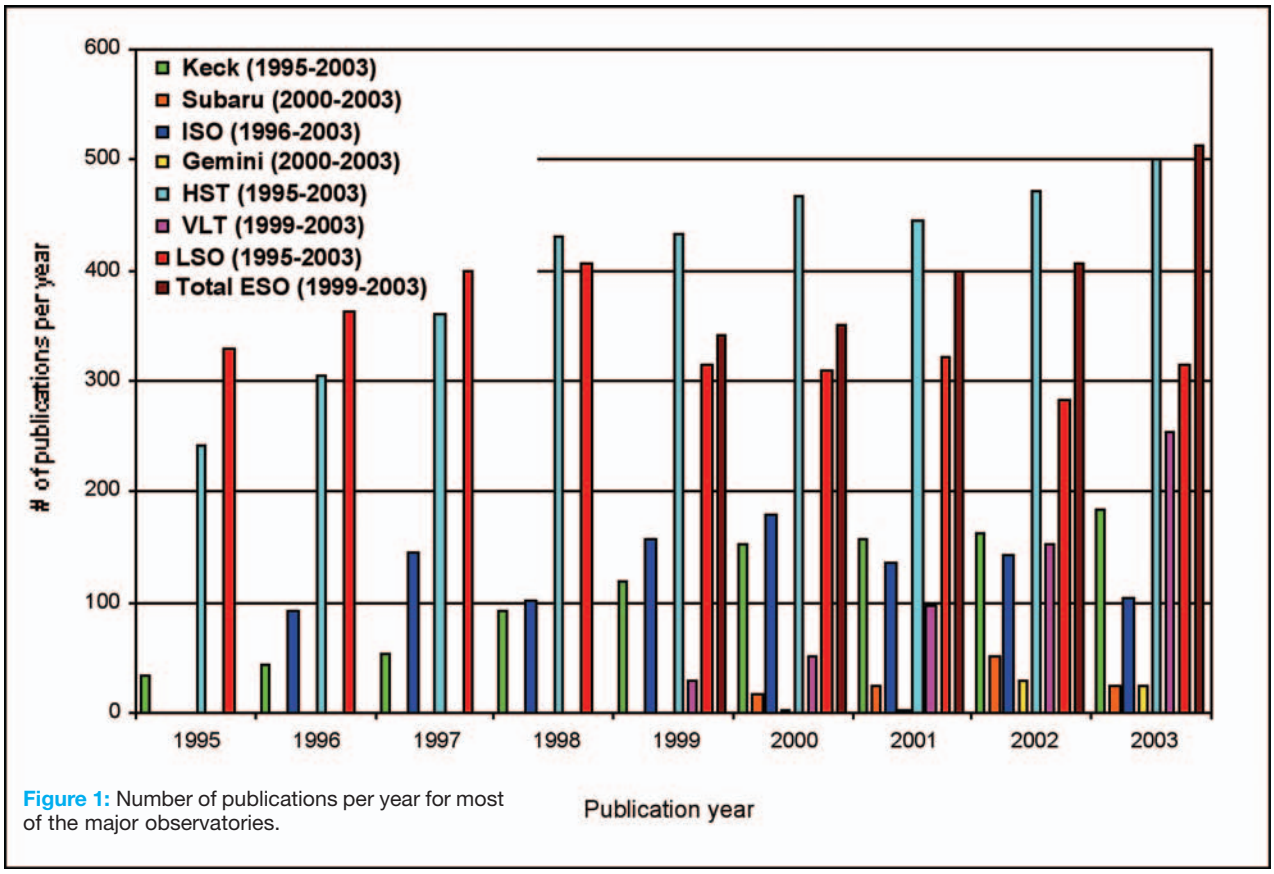


Figure 1: Number of publications per year for most of the major observatories.

YEAR	Telescopes operated by ESO	Number of Instruments (*)	National Projects (**)
1995	10	27	50cm Dan, 60cm Bochum, 35cm Marseille, DENIS, IRIS, 72cm Swiss
1996	10	24	50cm Dan, 60cm Bochum, 35cm Marseille, DENIS, IRIS. 72cm Swiss, MARLY, Brazil
1997	10	19	50cm Dan, 60cm Bochum, 35cm Marseille, DENIS, IRIS, 72cm Swiss, 1.2m Swiss, MARLY, Brazil
1998	8	18	50cm Dan, 60cm Bochum, 35cm Marseille, DENIS, IRIS, 1.2m Swiss, MARLY, Brazil
1999	6	17	50cm Dan, 35cm Marseille, DENIS, IRIS, 1.2m Swiss, Brazil
2000	6	14	50cm Dan, DENIS, IRIS, 1.2m Swiss, MARLY, Brazil
2001	6	13	50cm Dan, DENIS, IRIS, 1.2m Swiss, MARLY, Brazil
2002	6	14	50cm Dan, 1.2m Swiss, IRIS, MARLY, Brazil
2003	4 (3)	9	50cm Dan, 1.2m Swiss, REM, 1.54m Dan, Tarot II?
2006+	2	6	1.2m Swiss, REM, Tarot II, ILMT?, 2.2m?

Table 2: Evolution of La Silla facilities since 1995

(*) The March-September period was used when numbers varied within a year. (**) The IRIS and Marseille agreements are still valid, but have operated only until the dates shown.

the most productive ground-based observatories in the world, and was only surpassed in publications by HST after 1997.

La Silla is also very cost effective. Table 1 presents a compilation of operating costs for all major European observatories. The data was gathered as part of the EC/FP6 OPTICON Access program (www.otri.iac.es/opticon). According to the EC definition, direct costs do not include items like instrument development, renewal of equipment (e.g. computers), etc. Therefore, although there are differences in the way the direct costs are computed by each observatory, the figures in Table 1 are directly comparable.

A rather surprising result of this comparison is that, while the operations models of the different observatories vary widely, the operations costs are remarkably similar (not counting the Hawaii telescopes).

So, whether an observatory operates with large numbers of staff permanently on the mountaintop, or with most of the technical staff located off the mountain, the cost of producing high quality data is roughly constant. Taking the numbers at face value, La Silla comes out as one of the most cost effective European observatories.

Optimizing costs

The LS2006+ working group also asked ESO to look for ways of optimizing the operation of La Silla in order to further reduce costs. Thus, the ESO management examined a number of different scenarios to estimate 2006+ operating costs. To set the results into perspective, it is useful to examine the evolution of La Silla both in terms of facilities and costs over the past decade. Table 2 presents the evolution of facilities operated by ESO and also by "National" consortia. Figure 2 presents the corresponding evolution in cost (past and projected future). The result is that going from four telescopes to only two does not lead to a factor of two reduction in cost. There are fixed costs – one third of the La Silla budget goes into maintaining the infrastructure. All the studied scenarios showed that it is impossible to reduce the costs of La Silla below a certain limit without seriously compromising the quality of the product. In fact, we can predict this limit from the OPTICON table: two telescopes times 330 nights times 7 k = 4.6 M .

The most cost effective scenario was found to be the one in which La Silla and Paranal are merged into a single observatory. By sharing highly qualified staff, and realizing all the potential synergies between the two observatories, the projected cost of running La Silla comes out very close to the OPTICON limit.

Thus, LS2006+ recommended that ESO investigate the possibility of merging the two observatories. The plan was studied during 2003, and the outcome is presented below.

A Merged La Silla and Paranal Observatory

All relevant departments of the two observatories held consultations and discussions that resulted in joint proposals that underlie the merger plan. The plan is based on merging the individual groups within the observato-

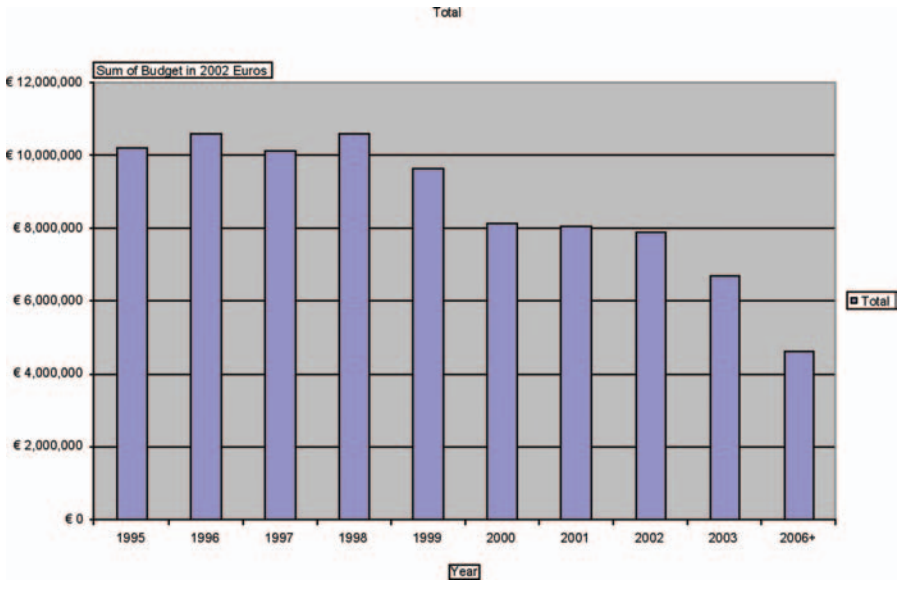


Figure 2: Evolution of La Silla costs since 1995

Table 3: Merger implementation

Stage 1	Stage 2	Stage 3	Stage 4
Merge electronics	Merge the software groups	Separate Power generation and distribution to 10kV (outsourcing option)	Merge Instrumentation
Merge mechanics	Communications on La Silla move to IT La Silla	Separate Electrical from Electronics on Paranal	Merge Optics
Create Instrumentation on La Silla	Create Maintenance team on La Silla	Merge Maintenance	Merge Logistics
Separate IT from software at La Silla		Possible upgrade of La Silla Paranal WAN bandwidth	

ries to a more matrix like structure rather than a La Silla department of Paranal observatory (this option did not arise within the low level technical discussions amongst the staff and was therefore not explored although it remains a viable option).

The current operational paradigms differ dramatically between the two observatories with La Silla mostly a stable operation supporting visitors and Paranal a growing observatory performing a significant fraction of service observing. We believe that this diversity is to the benefit of our users and the staff and therefore the Science Operations departments will not be merged, at least initially. Being a well-established and robust scientifically successful operation, La Silla provides the ideal conditions to explore innovative ways of carrying out science operations.

Additional benefits of the merger are identified in the training value, both for ESO staff and for future observational astronomers, and in possible long-term savings. The La Silla workshop will continue producing parts, and spare parts, for Paranal. La Silla support of Paranal's peak load activities will also continue. Moreover, La Silla will continue to provide the community with the infrastructure and support to deploy new instruments without the constraints of Paranal. An excellent example of such a project is the 3.6m/HARPS combination.

Merger implementation

The following phases are foreseen (see Table 3). They are broken down according to the sequence in which they would occur.

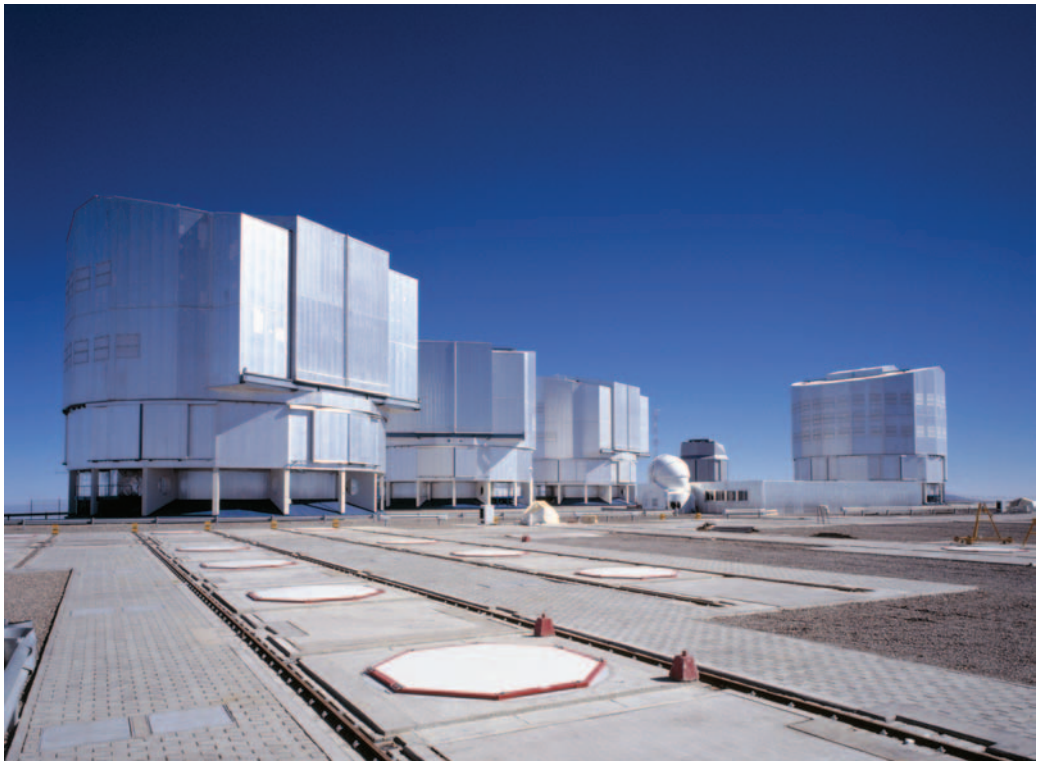
As they merge, groups report to the Heads of Department on Paranal (with the exclusion of the La Silla Science Operations department). After each stage, an assessment of the process will take place and modifications or improvements introduced if necessary. Th'ESObservatoire will, of course, have a single director.

Coda: is it possible to break the cost barrier?

La Silla has introduced two innovations (at least for medium size observatories) that should allow reduced costs and increased efficiency. The first is to control all (ESO operated) telescopes from a common Paranal-like control center. The new control *zentrum* (the RITZ) provides the environment required to optimize the time and expertise of the operations staff.

The second innovation is to implement a formal quality management system for continuous improvement. La Silla is probably the first observatory in the world to obtain an ISO9001:2000 certification. This process should allow us to optimize the use of resources.

The LS2006+ working group recommended that ESO should investigate ways of keeping the 2.2m telescope in operation without increasing the global cost of La Silla. With the innovations above, we believe we will be able to continue to offer FEROS to the community (if demanded) for part of the time. The complete telescope (with FEROS, WFI, and GROND) could be offered the rest of the time to groups interested in long term targeted programs (in a cost neutral way to ESO).



General view of the Paranal Observatory Platform with six domes (from left to right): ANTU, KUEYEN, MELIPAL, AT1, VLT Survey Telescope (still to be installed) and YEPUN. Some of the positions for the Auxiliary Telescopes and the railway tracks on which they move are seen in the foreground (*ESO PR Photo 02d/04*).