0.56″ of spherical aberration, similar to the 0.53″ given by Antares.

4. Measurements made during May 1996 with ADONIS by P. Prado and E. Prieto showed that the spherical aberration was between 0.5″ and 0.6″.

In addition, during the June nights, the following measurements were done with Antares:

At the nominal focus, 0.56″ of spherical aberration was found, 30 cm below the nominal position, 1.0″ was measured and at 10 cm below the nominal focus, a negligible spherical was found (0.11″). Both 3rd-order calculations and computer simulations showed that, to remove 0.5″ spherical at this telescope, one has to move the focal plane down by 120 mm. This coefficient (240 mm/″) corresponds to what was measured by Antares in June and also corresponds to the coefficient given by Ray Wilson (237 mm/″). We know now how much we have to move the focal plane to correct a given spherical aberration. But first we have to confirm the value of the residual spherical aberration. F. Franza and B. Delabre measured 0.27″ in 1982, however, we do not know the exact conditions under which this value has been obtained. Since February 1996 we have measured spherical aberrations of the order of 0.5″.

Although we can now trust the Antares measurements, the apparent variability of the spherical term (see Table 4) has still to be understood. Ray Wilson suggested that this could be produced by mirror seeing. This interpretation is very appealing, but it is not easy to understand how this can be produced in practice, because these layers would be required to have the size of the pupil, and in addition, remain stable over one night. There are at least two possibilities:

(a) The mirror is enclosed in the centre piece. Stable layers of air could be formed more easily above the mirror, inducing a spherical term.

(B) There is a direct influence on the beam, at the level of the Cassegrain adapter. One year ago, a heat source (rotator encoder) was spotted only 30 cm away from the beam inside the adapter. This source could have been a cause of "variable" spherical term. The Cassegrain hole is now insulated to shield off this heat source.

In addition, during the last months, mirror cooling has been applied, and this could explain why the "spherical" term never reached very high values. Substantially, Ray Wilson's interpretation seems very attractive; in this case the spherical aberration would be the product of a misplacement of the focal plane, combined with a (variable) component induced by mirror seeing or air instabilities along the light path. Of course we have to confirm this by carrying out much more measurements and simulations.

There is still a lot of work to do, however the goals should be achievable. Of all the traditional 4-m-class telescopes, the 3.6-m has certainly the best intrinsic optical quality, but it does not give the best images – not yet.

6. Pointing Model

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The pointing of the 3.6-m has been erratic for a long time: pointing models were repeated quite often and an individual model was needed for each instrument. What was more worrying, the model was not stable in time.

In the last two years, several changes occurred, both from the operational and from the physical point of view. The models are now performed by starting from scratch (and are not anymore incremental); stiffening of the spider has been applied, and the new TPOINT (Wallace, 1995) software has been made available. Several pointing models have been repeated during the last year, as frequently as possible, with all instruments and top-end configurations. The results are summarised in a report (available in the WWW page of the 3.6-m+CAT TT).

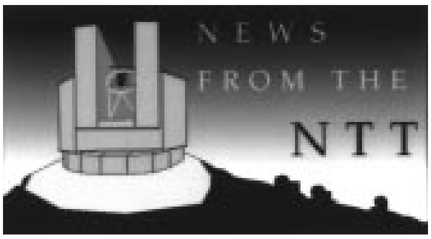
Substantially, the behaviour of the telescope is quite regular, and pointing models with an RMS of less than 10″ are obtained by using only a limited number of physical parameters (14), without the need of polynomial terms.

Models performed before and after the June 1996 intervention, of course, are different, but they remain stable with time, largely independent of instrument and top-end exchanges. The parameters used are indeed the same for the 3 instruments at F/8.

Although these performances are not yet comparable with the best pointing telescopes, they are satisfactory for the instrumentation presently available at the 3.6-m telescope. Some physical limitations exist at the moment on the telescope (i.e. hysteresis in the secondary unit); however, we think that these performances can still be improved by refining the measurement technique, and by collecting enough data to search for second-order terms.

7. Acknowledgement

During this technical time at the 3.6-m telescope both shifts of the Mechanics Support Team have been involved at the same time, together with the staff of the Telescope Team, putting in a lot of effort to accomplish the mission and to cope with all the unpredictable. Special thanks shall be given here to both teams!



The NTT upgrade project has the following goals:
1. *Establish a robust operating procedure for the telescope to minimise down time and maximise the scientific output.*
2. *Test the VLT control system in real operations prior to installation on UT1.*
3. *Test the VLT operations scheme and the data flow from proposal preparation to final product.*

J. SPYROMILIO, ESO

This article is being written at the end of August during the second phase of the NTT upgrade project. I am pleased to be able to describe some of the activities undertaken while the NTT has been off-line. For those not wishing to read much further, the short news is that we are progressing according to the detailed daily schedule with some tasks running one or two days ahead of time. In the context of the overall aims of the project and the critical question of "when will the NTT be back on-line?" such minor variations do not have any significant impact. However, the adherence to the schedule during the hectic first couple of months suggests that we have correctly budgeted for the time needed.