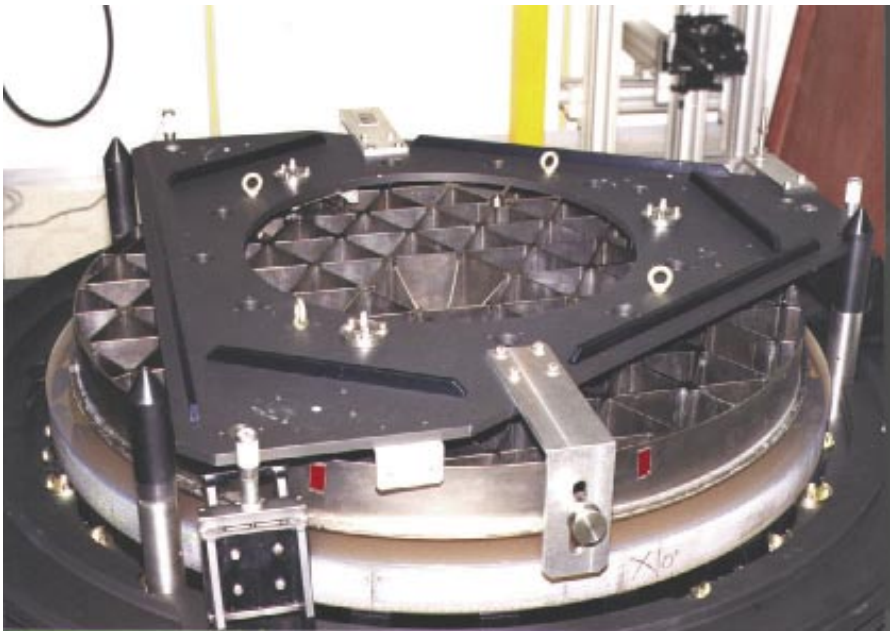

Figure 3: The secondary mirror mounted in the optical test set-up. Below the mirror the Zerodur matrix used for optical testing is visible.

In the meantime, polishing of the first of the four Beryllium secondaries at REOSC Optique in Paris is well progressing. The final polishing is almost completed with the optical quality approaching the specified Central Intensity Ratio. During the polishing, intermediate testing was done by means of a matrix test set-up (see Figs. 2 and 3), after integration of the mirror in its final Titanium cell. At carefully chosen intervals during the polishing, the mirror was submitted to thermal cycling to reduce internal stress and obtain a long-term optical stability. The remaining tasks ahead are related to the cutting of the external edge of the mirror, necessary because in its final dimensions the secondary is undersized and defines the pupil of the telescope. After the cutting, the optical figure will be verified to see if a final polishing retouch is necessary. These activities are expected to be completed during the summer.

Subsequently, the mirror will be shipped to Dornier where it will be integrated into the electromechanical unit. At this point, the fourth and last step of the M2 Unit tests will start in a set-up simulating the telescope spider. The purpose is to verify that there is no structural interaction between the M2 Unit and the telescope structure since this could lead to reduced chopping performance. The M2 Unit is expected to be delivered in late summer in time for the integration in the telescope on Cerro Paranal.

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The VLT Mirror Coating Unit Ready for Shipment

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In August 1995, the European Southern Observatory signed a contract with Linde AG, Germany, for the supply of the coating unit for the VLT mirrors. Together with their main subcontractors, BOC Coating Technology, UK, and Deggendorfer Werft, Germany, Linde meanwhile completed the development, construction and pre-commissioning of the coating unit in Deggendorf. On the 14th of May 1997, the preliminary acceptance review meeting took place, and it was concluded that the coating unit is fully capable of producing aluminium coating on the VLT mirrors with the specified quality.

The coating unit (see pictures of the coating unit inside the facilities of Deggendorfer Werft, located directly at the Danube river) is a large vacuum chamber with a diameter of 9.4 metres and a volume of about 122 m^3. The high vacuum is generated by 8 cryo-pumps which are located on top of the vacuum chamber. The chamber is divided into two halves by a horizontal flange sealed by O-rings (see Fig. 2). The mirror is loaded into the lower half of the chamber onto a whiffle-tree support system with

Figure 1: The coating unit for the VLT mirror substrates at Deggendorfer Werft premises. The circular platform on top of the chamber provides personal access to the cryo-pumps, feedthrough, vacuum gauges, etc. located on top of the chamber.

Figure 2: The lower part of the coating unit vacuum chamber moved out beneath the fixed upper part. Inside the chamber the rotatable whiffle-tree for support of the primary mirror is visible. Here, a steel plate serves as a dummy mirror for testing purposes.

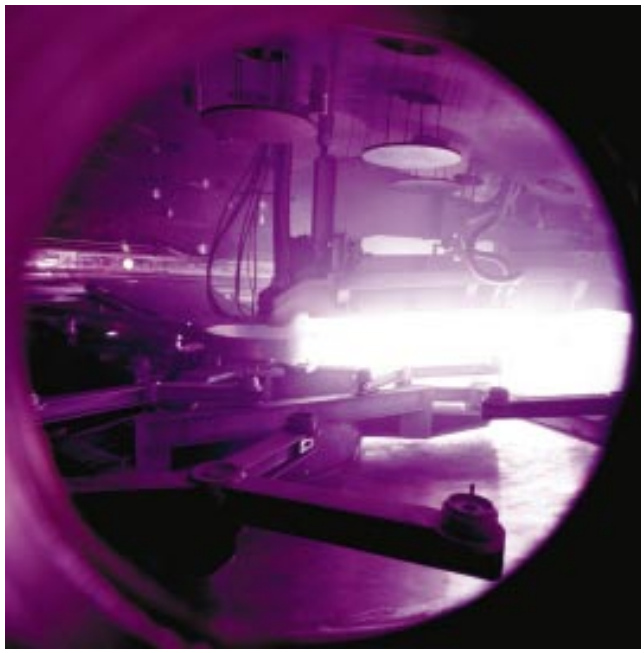

Figure 3: A view through one of the vacuum chamber windows while the glow discharge cleaning device is fired. The blue light is emitted from the plasma generated by the glow discharge electrodes. Above the shiny discharge area the contours of the sputter source arrangement are visible. In the lower part of the picture one recognises the whiffle-tree loaded with the dummy.

27 axial pads and laterally secured inside the central hole by 6 pads. This support system is fixed on a central shaft which is driven by a high-precision motor gear system arranged below the vacuum chamber. The 80 nanometre (i.e. 80 millionth of a millimetre) thin aluminium coating is deposited by utilising magnetron sputtering technology. During the coating process, the mirror is rotated slowly under the sputter source, which is fixed inside the upper half of the vacuum chamber. The lower half of the vacuum chamber is mounted onto an air cushion vehicle via 4 large spindles for closing and opening of the vacuum chamber. For loading and unloading of the mirrors, the lower half of the chamber is moved on 8 air-cushions from the coating unit location to the mirror handling tool and vice versa.

During the next weeks, the coating unit is dismantled at Deggendorfer Werft, packed and loaded onto a river barge. The vacuum chamber with its 9.4 metre diameter and 60 tons overall weight will be one of the largest pieces shipped for the VLT project. The transport goes from Deggendorf on the Danube, Main and Rhine rivers to Antwerp in Belgium. There the coating unit is loaded onto the ship to Antofagasta leaving beginning of June. The coating unit will finally arrive on Paranal by the end of July, 1997. There it will be installed inside the mirror maintenance building. The completion of the erection and provisional acceptance of the coating unit is planned for the end of October 1997.

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Figure 4: The 'giant dome' – The upper vacuum chamber part carrying the sputter source arrangement (top right) and the catcher disks below the cryo-pumps (top centre). The lower chamber part is transported out by means of the air cushion cart (orange) moving along the metallic strips (bottom left and right).