– Programme checking with graphics, simulation of the machining:
  (a) display of blank
  (b) views in three planes
  (c) plan view with depth display
  (d) 3D view
  (e) magnify.

The Mikron machines on La Silla and Garching have demonstrated excellent performance and this has enabled us to manufacture not only the Optopus but also to participate in the manufacture of "EMMI", the extraordinary instrument mechanically designed by H. Kotzlowski and described by S. D'Odorico (see *The Messenger* No. 61, September 1990) and with which R. Buettinghaus and myself have been working for almost one and a half years in the Garching Mechanical Workshop.

As the dawn of the VLT approaches, we are well equipped to deal with the instrumentation of tomorrow.

News About Adaptive Optics

After the successful initial test of the adaptive optics prototype system on the 3.6-m telescope (see *The Messenger* No. 60), a second test run was performed from September 26 to October 2, 1990. The aim of this run was to test two improved Shack-Hartmann wavefront sensor configurations, a sensor for the visible wavelength range, equipped with an electron bombarded CCD (EB-CCD), and an infrared wavefront sensor.

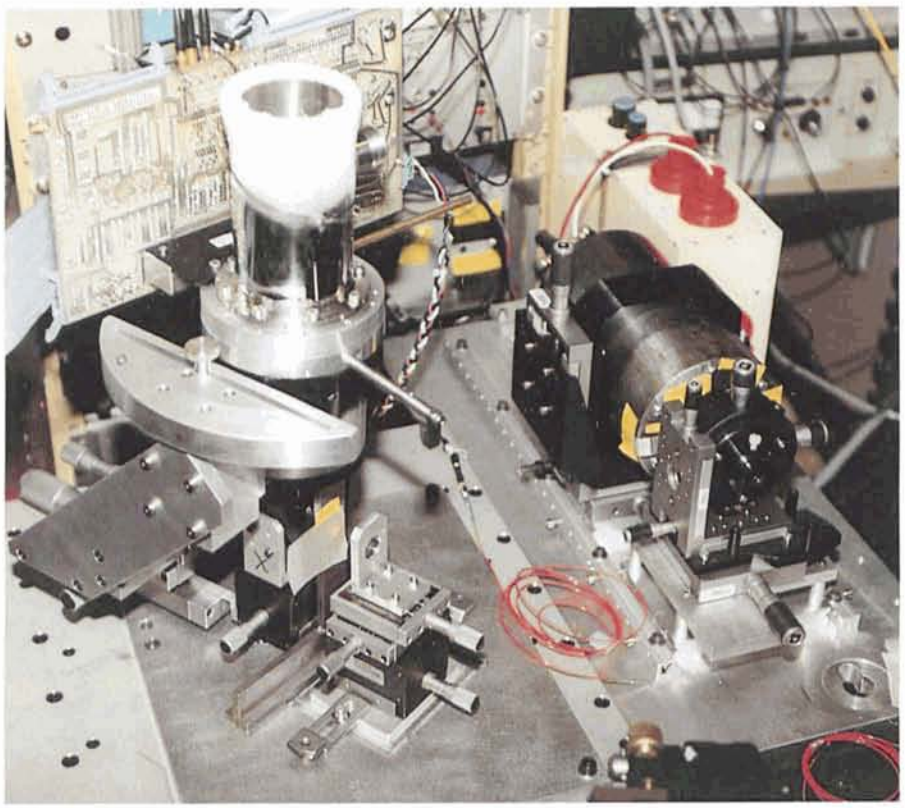
The EB-CCD sensor was developed by the Observatoire de Paris. The EB-CCD, which is still in a prototype phase, was manufactured by LEP (Philips) in France and allowed to push the limiting magnitude for wavefront sensing in the visible to approximately m_v = 11.5, a substantial gain compared to the old sensor which was based on an intensified Reticon and only reached m_v = 8.5. The new sensor appears to be quantum noise limited.

In a second test an infrared wavefront sensor was applied to the adaptive system. This sensor was built by the Observatoire de Paris and LETI-LIR in Grenoble, where the 64 by 64 InSb detector array has been developed with a readout noise of 450 electrons. Although the system transmission was not yet fully optimized, the servo system, locked on a star of m_K = 2.5, offers very good prospects for the future. For this sensor, the limiting magnitude still has to be determined, but it has already proven to be suitable in the closed-loop system.

The above-mentioned test run was aimed at purely technical features and fine-tuning of the prototype system. A science-devoted run with the adaptive optics system followed from October 24 to November 5. For the first time, 6 nights have been exclusively devoted to the scientific exploration of adaptive optics. The set-up and activation of the system has now become a nearly routine operation, and for the team of astronomers from Observatoire de Paris-Meudon it was possible to concentrate fully on the science aspects of their observations.

A second similar science-devoted run is planned for January 1991 before the system will undergo a major upgrade. In early 1992 it will be available again with a deformable mirror with approximately 50 actuators and an increased bandwidth of 25 Hz to possibly 40 Hz (at 0 dB). This will allow diffraction-limited observations at the 3.6-m telescope in the K-Band and possibly the H-band with good seeing. Although it will still be a prototype, we will attempt to make it more "user-friendly". It may then be offered to the ESO community in late 1992 for a limited number of programmes.

F. MERKLE, ESO
F. RIGAUT, Observatoire de Meudon



This picture shows improved Shack-Hartmann wavefront sensors. They can be installed simultaneously on the prototype system optical bench. The EB-CCD based sensor is shown on the right side with the lens array mounted in the alignment stage in front of the cylindrical detector housing. The infrared sensor with its small cryostat is shown on the left. Here the light enters from below via a relay lens and a folding mirror.

MIDAS Memo

ESO Image Processing Group

1. Application Developments – Graphics

The MIDAS graphics package has been subject to a number of questions during the course of this year. Although in principle one can obtain all important information from the MIDAS User Guide (Volume A, Chapter 6), we would like to summarize here briefly the available functionality.

The MIDAS graphics sub-system enables you to visualize (plot) all data structures in MIDAS: frames, tables, descriptors and keywords. To do so, obviously named plot and overplot commands have been implemented. In general these commands have a well defined syntax.