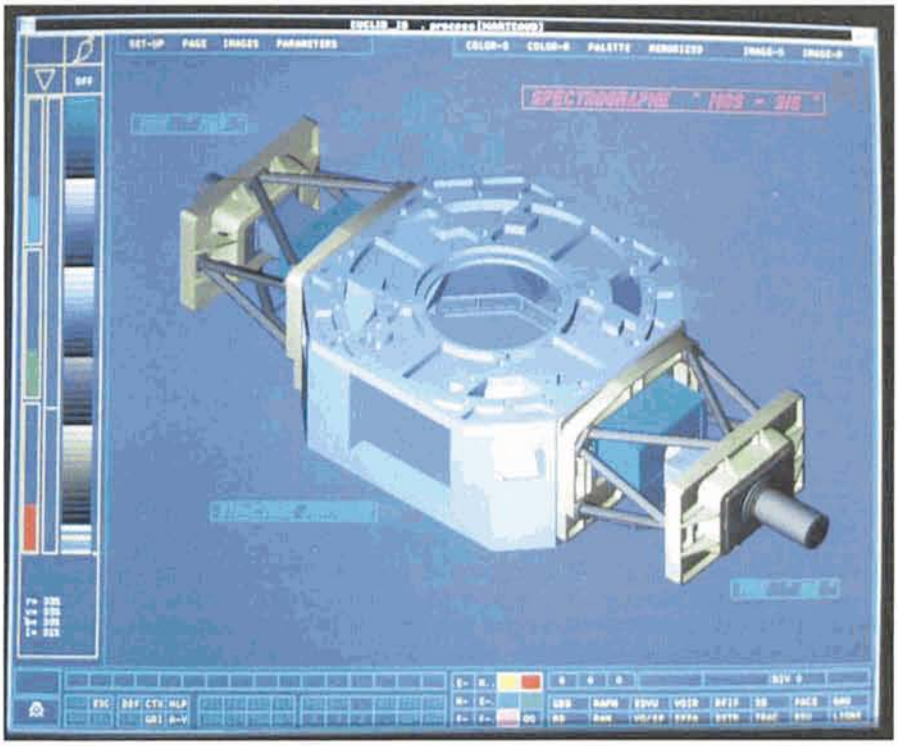

Figure 11: *The Second-Generation CFHT Cassegrain Spectrograph is in reality a double spectrograph. One arm (here at top left) is MOS, a multi-object spectrograph with a 10 arcmin field. The other arm (bottom right) is SIS, a sub-arcsecond imaging spectrograph with a 3 arcmin field.*

resources at their disposal. They will therefore be faced with choices and compromises. These compromises will translate into imperfections of the point spread function (PSF). Among these less than perfect PSF, which ones will be most useful, or best adapted to a particular type of observations? The one with the faintest halo? The narrowest central peak? The maximum strehl ratio? Simulations of observations of different objects with a variety of PSF are a prerequisite to answering these questions. The answer will depend both on the scientific application of adaptive optics and on technical limitations.

3. Instruments and Components

The fourth day of the Conference was devoted to the description of instruments under construction for 4-m class or 8-m class telescopes with a large fraction of the time given to the instrumentation for the VLT. (Six VLT instruments are now in the final design stage – see *The Messenger* **65**, 67.) Present and predicted performances of three types of components were also discussed: optical fibres, CCD and NICMOS detectors.

The two largest groups of instruments represented in the 33 posters and the 16 talks were the faint object spectrographs and the infrared instruments. In the first case, the impetus is given by the current emphasis on cosmological observational programmes and the increasing reliability and sophistication of optical fibres and multislit systems. In the case of the infrared instruments, the impetus comes from the rapid improvement of the performances of infrared detectors, in particular the number of pixels, and the perspective of using the large telescopes at or near their diffraction limit.

While almost all of the telescopes and instrument designs were for multipurpose observations, one project stood out: The Sloan Digital Sky Survey is a 2.5-m telescope (with a 3-degree field of view) whose scientific purpose is to obtain a new sky survey, and to measure optical spectra of 1 million galaxies and quasars selected from this survey with the aim of getting an empirical description of their 3-D distribution (large-scale structure) and their cosmic evolution.

The telescope is devoted to the above astrophysical project and does not have to justify its existence beyond the accomplishment of this project. In that sense, it bears some similarities with the large experiment built around particle accelerators or the older generation of radio telescopes.

A distant cousin and complement of this project is the DEEP, the Deep Extragalactic Evolutionary Probe. This is a spectrograph planned for the Keck Telescope and which will be dedicated to one task: obtaining the redshift and velocity dispersion of 10^4 to 1.5×10^4 faint galaxies of magnitude up to 23 to 24. The spectrograph is in fact made up of 4 identical spectrographs at the Cassegrain focus of the Keck telescope. The spectrographs probe 4 fields disposed symmetrically around the optical axis, the central field being used for TV acquisition and guiding.

Mirror Container and VLT 8.2-m Dummy Mirror Arrive at REOSC Plant

P. DIERICKX and W. ANSORGE, ESO

Within the framework of the VLT primary mirror polishing contract, an 8.2-metre reinforced concrete dummy mirror was manufactured in Dunkirk by SOCOFRAM, REOSC subcontractor for the manufacturing of the dummy mirror, mirror handling tool and transport container.

Although no "first light" is scheduled for this unfortunate brother of the Zerodur mirrors, it is already experiencing the first steps in the life of a real mirror. Indeed, the dummy mirror will serve many purposes:

- test of the mirror handling tool;
- test of the mirror container upon road and river transport and upon handling;
- test of the grinding and polishing machines at REOSC plant;
- tests with the primary mirror cell and structure;
- integration tests in Chile.

The two first steps are now completed. On April 13 it was loaded into the transport container. Figure 1 shows the white-painted concrete mirror being held above the transport container. The curvature of the mirror is clearly visible. Note the 28 dampers (dark plots on the container bottom surface) that will support the mirror and damp the vibrations transmitted by the transport vehicles. The operation was conducted under conditions much tougher than the ones the Zerodur mirror will experience (single hook crane, poor adjustment control), and two trials were necessary to bring the mirror down horizontal and correctly centred. The Zerodur mirrors will be handled with three-hook cranes that allow far better control.

After that vibration sensors were mounted onto the dummy mirror and into the container and the box was closed. The mirror learned patience while endemic strikes in Dunkirk harbour delayed the ship loading, that finally took place on May 21. Lifting a 36-ton 8.4-m diameter box with a single central hook seems quite a challenge. However, crane operations proved much smoother than expected and the container was lowered down into the cargo bay without particular problems.

The ship left Dunkirk on May 22 and headed through the Channel and up the Seine toward Evry, south of Paris. According to the crew, it made quite an impression crossing Paris, river boats being usually much smaller. Last but not least, it's almost active: the whole cabin can be lowered down at the level of the bay roof thus allowing the ship to pass under rather low bridges.

While still in the Channel the crew made tests to feed the vibration sensors with data the (superb) weather was seemingly not decided to provide. Full power manoeuvers back and forwards reportedly did not generate significant vibration levels. While going up the Seine, inevitable shocks occurred at the crossings of locks.

Figure 1: *Dummy mirror being loaded onto the transport container.*

In the morning May 25 the ship was at the dock in Evry, ready to be unloaded with a mobile 200-ton crane. Figure 2 shows the mirror container being unloaded from the ship. With the Zerodur mirrors, dampers will be mounted on the sides of the container to damp possible lateral shocks.

While in Dunkirk a standard truck was used to carry the mirror to the dock, in Evry the type of truck that was selected for the transport of the Zerodur mirrors was used. The key feature is the hydraulic platform that allows a precise control of the container movements. The platform can be driven under the container and lifted up to load the container. In addition, the platform can be tilted by $\pm$ 10° (see roll test shown in Figure 3). In the afternoon further tests were conducted, such as full power acceleration followed by emergency braking, or acceleration while driving over a 6-cm-thick wooden beam (the beam is still ok).

Figure 4 shows the truck at about 10:30 p.m., awaiting its escort after being washed by a light rain. The road transport started at about 0:00 on May 26. Access to the speedway was slightly problematic; a few low branches believed they could stop the progress of science. Actually, they were wrong; mercy for their soul. Figure 5 shows the truck on the access road to the speedway.

The speedway was closed for about half an hour, the time for the truck to drive to the exit that still bears no other mark than "REOSC Optique". The vibration sensors were fed with data while the truck was driving at 5, 10, 15, 20 km/h and for a short time at the race speed of 25 km/h. On the road to REOSC plant, the speed was reduced to walking speed and the flowers of two roundabouts faced a dramatic shortcut of their life expectancy. Upon arrival at REOSC's gate we found a muddy horseshoe that we officially offered to

Figure 2: *Unloading of the ship in Evry.*

Figure 3: *"Rock-and-roll" test on the hydraulic platform.*

Figure 4: *10:30 p.m.: ready to go.*

Figure 5: *00:30 a.m.: on the way to REOSC plant.*

REOSC representatives.

Preliminary observations seem to show that even during the toughest tests, the accelerations experienced were well below the critical values for a Zerodur mirror. This, of course, will have to be confirmed after the data recorded by the vibration sensors will be reduced. That should be done by the end of June.

Introducing the First VLT Instrument Science Teams

J. M. BECKERS, ESO

As described in the *Messenger* **65**, page 10, ESO has embarked on a very ambitious programme of instrument construction for its Very Large Telescope. The simultaneous construction of four 8-metre telescopes with four focus stations each as well as combined foci using incoherent and coherent beam combination result in the need for a relatively large complement of instruments, well exceeding the initial instrumentation requirements of other large telescopes like the Keck telescope. The VLT instruments are being constructed both in-house by the ESO optical and infrared instrumentation groups and by consortia of institutes in ESO member countries. Recently contracts have been signed with a consortium headed by I. Appenzeller from the Landessternwarte in Heidelberg for the construction of two VLT Focal Reducers/Spectrographs (FORS) for the Cassegrain foci of the first and third VLT 8-metre telescopes and with a consortium headed by R. Lenzen from the Max-Planck-Institut für Astronomie, also in Heidelberg, for the construction of the Coudé Near Infrared Camera (CONICA) for the first VLT telescope. These instruments were described in the 67th issue of the *Messenger*. The instruments being built by ESO are the Infrared Spectrograph and Array Camera (ISAAC) for the first VLT telescope and two copies of the Ultraviolet/Visible Echelle Spectrograph (UVES) for the Nasmyth foci of the second and third VLT telescopes.

Both the ISAAC and UVES proposals were reviewed and approved by the ESO Scientific Technical Committee (STC). A number of other instruments are in the definition phase which will lead to proposals for their construction to ESO.

These instruments are common-user instruments being built for the scientific community. They therefore have to be built following high standards of quality, reliability and standardization. ESO has also decided to create for each instrument a team of scientists representing its user community (or "customers"). After the approval of each instrument, either by the signing of the construction contract or by STC approval, such an Instrument Science Team is created. The IST team monitors the implementation of its instrument, concentrating on issues relating to its scientific use. It is asked for its advice on matters relating to this use, and it reports directly to the ESO Director General and the VLT Programme Scientist.

At this moment Instrument Science Teams have been formed for CONICA, FORS and ISAAC. UVES was only approved recently (May 12, 1992) by the STC. Its IST will therefore be created shortly. The membership of the three Instrument Science Teams is as follows:

Coudé Near-Infrared Camera (CONICA)

T. de Jong (Groningen)
C. Perrier (Grenoble)
M.-H. Ulrich (ESO), chair
H. Zinnecker (Würzburg)

Focal Reducer/Spectrograph (FORS)

J. Bergeron (Paris)
S. Cristiani (Padova)
P. Shaver (ESO), chair
J. Surdej (Liège)

Infrared Spectrograph and Array Camera (ISAAC)

R. Chini (Bonn)
G. Miley (Leiden), chair
E. Oliva (Firenze)
J.L. Puget (Orsay)

Each IST has four members. For instruments built by ESO all members are selected from institutes in ESO member countries, for instruments built elsewhere the IST is chaired by a member of the ESO scientific staff. These teams represent the future user community of these instruments. They therefore welcome your input on scientific matters relating to these instruments, as does the VLT Programme Scientist (the author of this note).