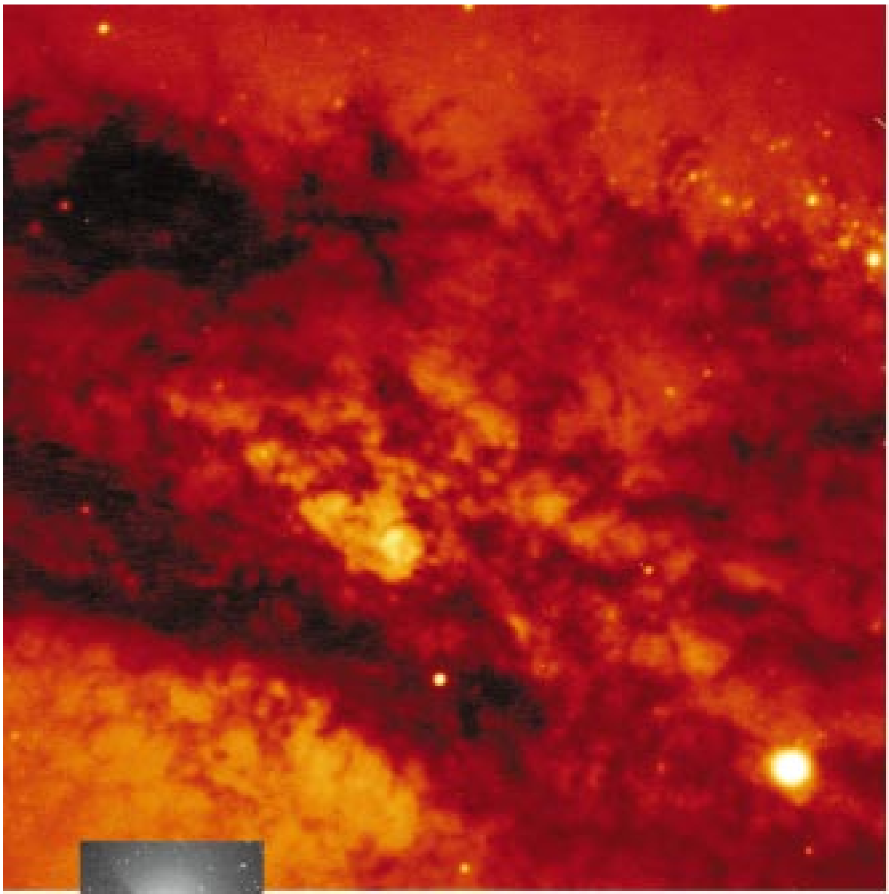
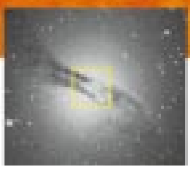




Centaurus A is the closest active elliptical galaxy and one of the strongest radio sources in the sky. This image shows part of the dust lane that obscures the central regions of the galaxy. This complex structure is believed to be the result of the recent collision between the old elliptical galaxy and a dwarf, gas-rich galaxy. Intense star formation is taking place within the violently stirred gas during the merging event.

This image was taken with the Test Camera of the VLT UT1 telescope on May 22, 1998, during a short, 10-sec exposure through a red filter to demonstrate the large light collecting power of the 53-m^2 mirror of the VLT UT1. It shows a wealth of fine details. The image quality is about 0.49 arcsec.

The insert shows a complete view of Centaurus A taken with another telescope. The brightest stars are foreground objects located within our own galaxy, but clusters of recently formed stars are visible at the edge of the dust lane.

With powerful infrared detectors to be mounted on the VLT later this year, astronomers will soon be able to probe deep into the dust lane, infrared light being less absorbed by dust than red light.

The Final Steps Before “First Light”

The final, critical testing phase commenced with the installation of the 8.2-m primary (at that time still uncoated) Zerodur mirror and 1.1-m secondary Beryllium mirror during the second half of April. The optics were then gradually brought into position during carefully planned, successive adjustments.

Due to the full integration of an advanced, active control system into the VLT concept, this delicate process went amazingly fast, especially when compared to other ground-based telescopes. It included a number of short test exposures in early May, first with the Guide Camera that is used to steer the telescope. Later, some exposures were made with the Test Camera mounted just below the main mirror at the Cassegrain Focus, in a central space inside the mirror cell. It will continue to be used during the upcoming Commissioning Phase, until the first major instruments (FORS and ISAAC) are attached to the UT1, later in 1998.

The 8.2-m mirror was successfully aluminised at the Paranal Mirror Coating facility on May 20 and was reattached to the telescope tube the following day. Further test exposures were then made to check the proper functioning of the telescope mechanics, optics and electronics.

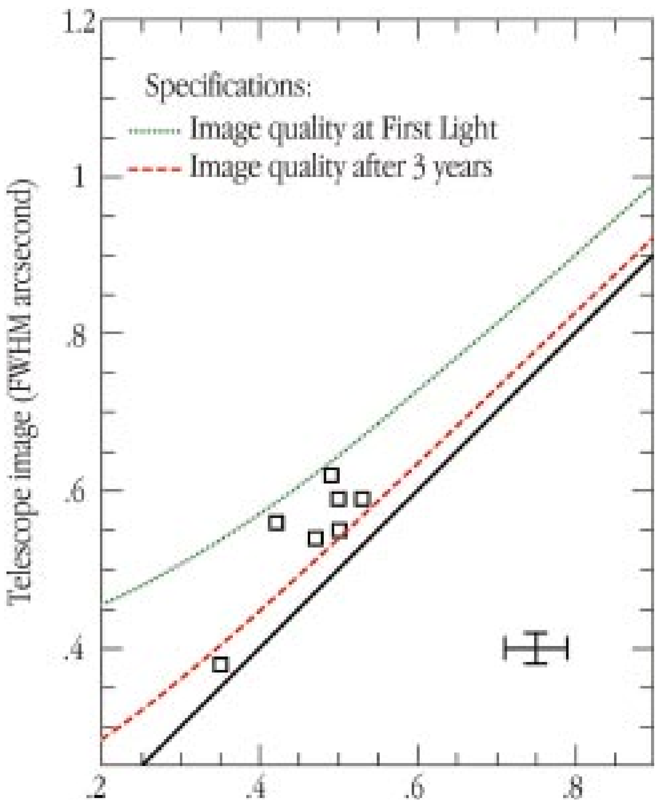
This has led up to the moment of First Light, i.e. the time when the telescope is considered able to produce the first, astronomically useful images. Despite an intervening spell of bad atmospheric conditions, this important event took place during the night of May 25–26, 1998, right on the established schedule.

The image shown on page 1 was obtained with the VLT UT1 on May 16, 1998, in red light (R band), i.e. while the mirror was still uncoated. It is a 10-minute exposure of the centre of Omega Centauri and it demonstrates that the telescope is able to track continuously with a very high precision and thus is able to take full advantage of the frequent, very good atmospheric conditions at Paranal. The images of the stars are very sharp (full-width-at-half-maximum (FWHM) = 0.43 arcsec) and are perfectly round, everywhere in the field. This indicates that the tracking was accurate to better than 0.001 arcsec/sec during this observation.

Omega Centauri is the most luminous globular cluster in our Galaxy. As the name indicates, it is located in the southern constellation Centaurus and is therefore observable only from the south.

At a distance of about 17,000 light-years, this cluster is barely visible to the naked eye as a very faint and small cloud. When Omega Centauri is observed through a telescope, even a small one, it looks like a huge swarm of numerous stars, bound together by their mutual gravitational attraction.

Most globular clusters in our Galaxy have masses of the order of 100,000 times that of the Sun. With a total mass equal to about 5 million solar masses, Omega Centauri is by far the most massive of its kind in our Galaxy.



Superb image quality is the prime requirement for the VLT. The VLT should take full advantage of the exceptionally good "seeing" conditions of the Paranal site, i.e. periods of time when there is a particularly stable atmosphere above the site, with a minimum of air turbulence.
In this diagram, the measured image quality of the VLT UT1 astronomical images is plotted versus the "seeing", as measured by the Seeing Monitor, a small specially equipped telescope also located on top of the Paranal Mountain.
The dashed line shows the image quality requirement, as specified for the VLT at First Light. The dotted line shows the specification for the image quality, three years after First Light, when the VLT will be fully optimised. The fully drawn line represents the physical limit, when no further image distortion is added by the telescope to that introduced by the atmosphere.
The diagram demonstrates that First Light specifications have been fully achieved and, impressively, that the actual VLT UT1 performance is sometimes already within the more stringent specifications expected to be fulfilled only three years from now.
Various effects contribute to degrade the image quality of a telescope as compared to the local seeing, and must be kept to a minimum in order to achieve the best scientific results. These include imperfections in the telescope optical mirrors and in the telescope motion to compensate for Earth rotation during an exposure, as well as air turbulence generated by the telescope itself. The tight specifications shown in this figure translate into very stringent requirements concerning the quality of all optical surfaces, the active control of the 8.2-m mirror, the accuracy of the telescope motions, and, in the near future, the fast "tip-tilt" compensations provided by the secondary mirror, and finally the thermal control of the telescope and the entire enclosure.
The only way to achieve an image quality that is "better than that of the atmosphere" is by the use of Adaptive Optics devices that compensate for the atmospheric distortions. One such device will be operative on the VLT by the year 2000, then allowing astronomers to obtain images as sharp as about 0.1 arcsec.
In this diagram, both seeing (horizontal axis) and telescope image quality (vertical axis) are measured as the full-width-at-half-maximum (FWHM) of the light-intensity profile of a point-like source. The uncertainty of the measurements is indicated by the cross in the lower right corner.

VLT First Light and the Public

R.M. WEST, ESO

On the unique occasion of the "First Light" of VLT Unit Telescope 1 (UT1), ESO went to great lengths to satisfy the desire by the media and the public to learn more about Europe's new giant telescope. Already three months earlier, preparations were made to have related photos, texts and videos available before the event and to involve the astronomical communities in the member countries in the presentation of the First Light results.

Two slide sets were published on the Web and as photographical reproductions that illustrate VLT Milestones and the Paranal Observatory as it looks now. A comprehensive series of 41 viewgraphs about the VLT, its technology and scientific potential was published in April. They are useful for talks about the VLT and related subjects. All of this material is available on the Web at URL:

http://www.eso.org/outreach/info-events/ut1fl/

A 200-page VLT White Book was compiled and published on the Web and in printed form just before the First Light event. It gives an overview of this complex project and its many subsystems.

In order to receive and process the first images from VLT UT1 in the short time available, a small group of ESO astronomers got together at the ESO Headquarters to form the "First Light Image Processing Team". As soon as the images arrived from Paranal, they were flat-fielded and cosmetically cleaned by the members of this group. In the late afternoon of May 26, it was decided which of these images should be included in the series of First Light photos that was released the following day. There were nine in all, including some that demonstrated the excellent optical and mechanical performance of the VLT UT1, others which were more "glossy", for instance a colour picture with fine details in a beautiful southern planetary nebula.

Through the good offices of ESO Council members, VLT First Light press conferences were organised in the eight ESO member countries on May 27 and also in Portugal and Chile on the same day. In the early morning of May 27, the members of the Image Processing Team travelled with the still hot press material from Garching to these meetings. Most of the meetings were opened by ministers or high-ranking officials from the Ministries of Education or Science. Introductory talks followed by the astronomer members of the ESO Council and other specialists knowledgeable of the VLT project. At the end, the "messengers" from ESO presented the new images and gave a personal account of the hectic, but exciting work that had taken place during the previous days.

There is little doubt that these press conferences were highly successful in conveying information about the VLT and its potential for astronomical research in a very positive way. In any case, literally hundreds of newspaper articles, TV reports, etc. appeared in the following days in all of these countries and elsewhere.

The introduction of the VLT to the European public and, not least, the future users of this wonderful new facility, has had a good start.

In the VLT control room at the moment of "First Light".