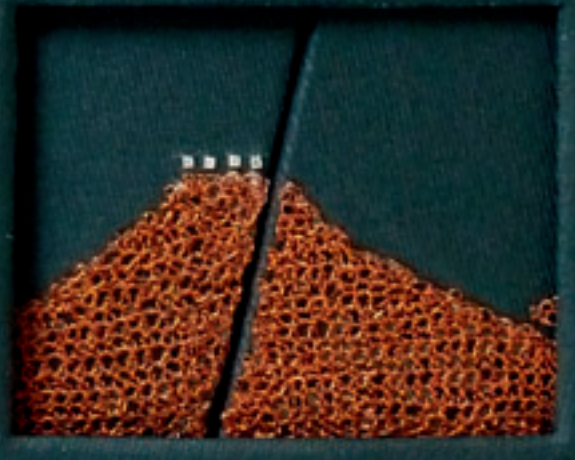


To his Majesty
Albert II of Belgium.

Sharing our admiration
of the wonders of the
Universe.

Top 100 Images from ESO

VISTA’s infrared view of the Orion Nebula

This wide-field view of the Orion Nebula (Messier 42), lying about 1350 light-years from Earth, was taken with the VISTA infrared survey telescope at ESO’s Paranal Observatory in Chile. The new telescope’s huge field of view allows the whole nebula and its surroundings to be imaged in a single picture and its infrared vision also means that it can peer deep into the normally hidden dusty regions and reveal the curious antics of the very active young stars buried there. This image was created from images taken through Z, J and Ks filters in the near-infrared part of the spectrum. The exposure times were ten minutes per filter. The image covers a region of sky about one degree by 1.5 degrees.

Credit: ESO/J. Emerson/VISTA.
Acknowledgment: Cambridge Astronomical Survey Unit

The Helix Nebula

This colour-composite image of the Helix Nebula (NGC 7293) was created from images obtained using the the Wide Field Imager (WFI), an astronomical camera attached to the 2.2-metre Max-Planck Society/ESO telescope at the La Silla observatory in Chile. The blue-green glow in the centre of the Helix comes from oxygen atoms shining under effects of the intense ultraviolet radiation of the 120 000 degree Celsius central star and the hot gas. Further out from the star and beyond the ring of knots, the red colour from hydrogen and nitrogen is more prominent. A careful look at the central part of this object reveals not only the knots, but also many remote galaxies seen right through the thinly spread glowing gas. This image was created from images through blue, green and red filters and the total exposure times were 12 minutes, 9 minutes and 7 minutes respectively.

Credit: ESO

VST image of the star-forming region Messier 17

The first released VST image shows the spectacular star-forming region Messier 17, also known as the Omega Nebula or the Swan Nebula, as it has never been seen before. This vast region of gas, dust and hot young stars lies in the heart of the Milky Way in the constellation of Sagittarius (The Archer). The VST field of view is so large that the entire nebula, including its fainter outer parts, is captured — and retains its superb sharpness across the entire image. The data were processed using the Astro-WISE software system developed by E.A. Valentijn and collaborators at Groningen and elsewhere.

Credit: ESO/INAF-VST/OmegaCAM. Acknowledgement: OmegaCen/Astro-WISE/ Kapteyn Institute

A 340-million pixel starscape from Paranal

The second of three images of ESO's GigaGalaxy Zoom project is a new and wonderful 340-million-pixel vista of the central parts of our galactic home, a 34 by 20-degree wide image that provides us with a view as experienced by amateur astronomers around the world. Taken by Stéphane Guisard, an ESO engineer and world-renowned astrophotographer, from Cerro Paranal, home of ESO's Very Large Telescope, this second image directly benefits from the quality of Paranal's sky, one of the best on the planet. The image shows the region spanning the sky from the constellation of Sagittarius (the Archer) to Scorpius (the Scorpion). The very colourful Rho Ophiuchi and Antares region features prominently to the right, as well as much darker areas, such as the Pipe and Snake Nebulae. The dusty lane of our Milky Way runs obliquely through the image, dotted with remarkable bright, reddish nebulae, such as the Lagoon and the Trifid Nebulae, as well as NGC 6357 and NGC 6334. This dark lane also hosts the very centre of our Galaxy, where a supermassive black hole is lurking. The image was obtained by observing with a 10-cm Takahashi FSQ106Ed f/3.6 telescope and a SBIG STL CCD camera, using a NJP160 mount. Images were collected through three different filters (B, V and R) and then stitched together. This mosaic was assembled from 52 different sky fields made from about 1200 individual images totalling 200 hours exposure time, with the final image having a size of 24 403 x 13 973 pixels.

Credit: ESO/S. Guisard (www.eso.org/~sguisard)

NGC 2264 and the Christmas Tree cluster

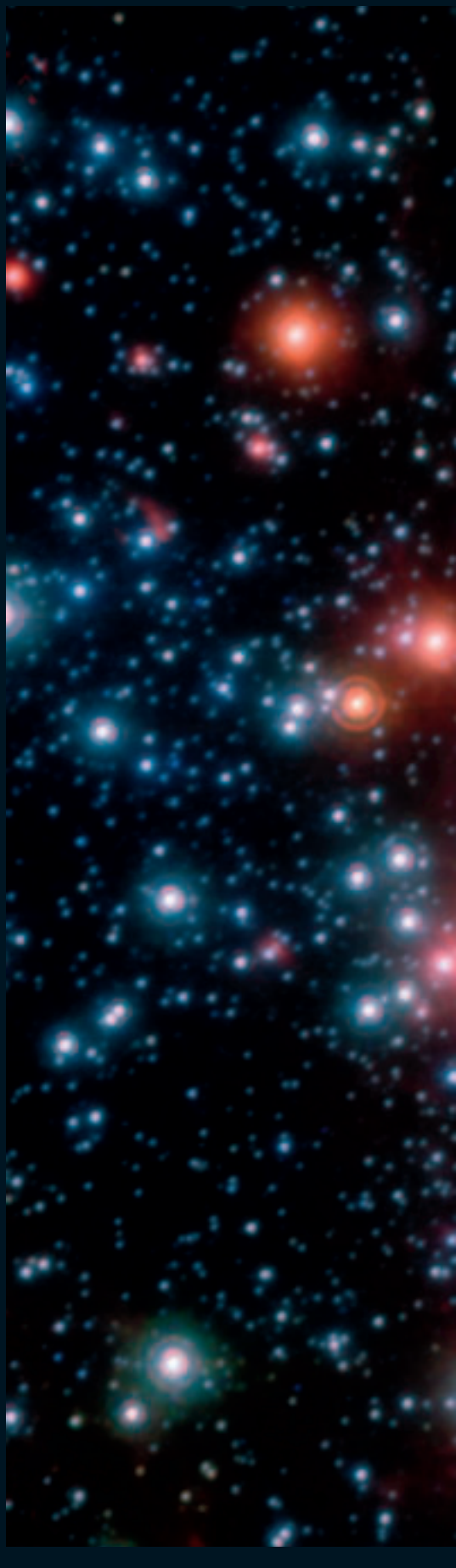
This colour image of the region known as NGC 2264 — an area of sky that includes the sparkling blue baubles of the Christmas Tree star cluster and the Cone Nebula — was created from data taken through four different filters (B, V, R and H-alpha) with the Wide Field Imager at ESO's La Silla Observatory, 2400 metre high in the Atacama Desert of Chile in the foothills of the Andes. The image shows a region of space about 30 light-years across.

Credit: ESO

The Centre of the Milky Way

The central parts of our Galaxy, the Milky Way, as observed in the near-infrared with the NACO instrument on ESO's Very Large Telescope. By following the motions of the most central stars over more than 16 years, astronomers were able to determine the mass of the supermassive black hole that lurks there.

Credit: ESO/S. Gillessen et al.



NGC 2467 and Surroundings

Area surrounding the stellar cluster NGC 2467, located in the southern constellation of Puppis (“The Stern”). With an age of a few million years at most, it is a very active stellar nursery, where new stars are born continuously from large clouds of dust and gas. The image, looking like a colourful cosmic ghost or a gigantic celestial Mandrill, contains the open clusters Haffner 18 (centre) and Haffner 19 (middle right: it is located inside the smaller pink region — the lower eye of the Mandrill), as well as vast areas of ionised gas. The bright star at the centre of the largest pink region on the bottom of the image is HD 64315, a massive young star that is helping shaping the structure of the whole nebular region.

Credit: ESO

The Horsehead Nebula

A reproduction of a composite colour image of the Horsehead Nebula and its immediate surroundings. It is based on three exposures in the visual part of the spectrum with the FORS2 multi-mode instrument at the 8.2-metre KUEYEN telescope at Paranal. It was produced from three images, obtained on February 1, 2000, with the FORS2 multi-mode instrument at the 8.2-metre KUEYEN Unit Telescope and extracted from the VLT Science Archive Facility. The frames were obtained in the B-band (600 sec exposure; wavelength 429 nm; FWHM 88 nm; here rendered as blue), V-band (300 sec; 554 nm; 112 nm; green) and R-band (120 sec; 655 nm; 165 nm; red). The original pixel size is 0.2 arcseconds. The photo shows the full field recorded in all three colours, approximately 6.5 x 6.7 arcminutes. The seeing was about 0.75 arcseconds.

Credit: ESO

ESO’s VLT reveals the Carina Nebula’s hidden secrets

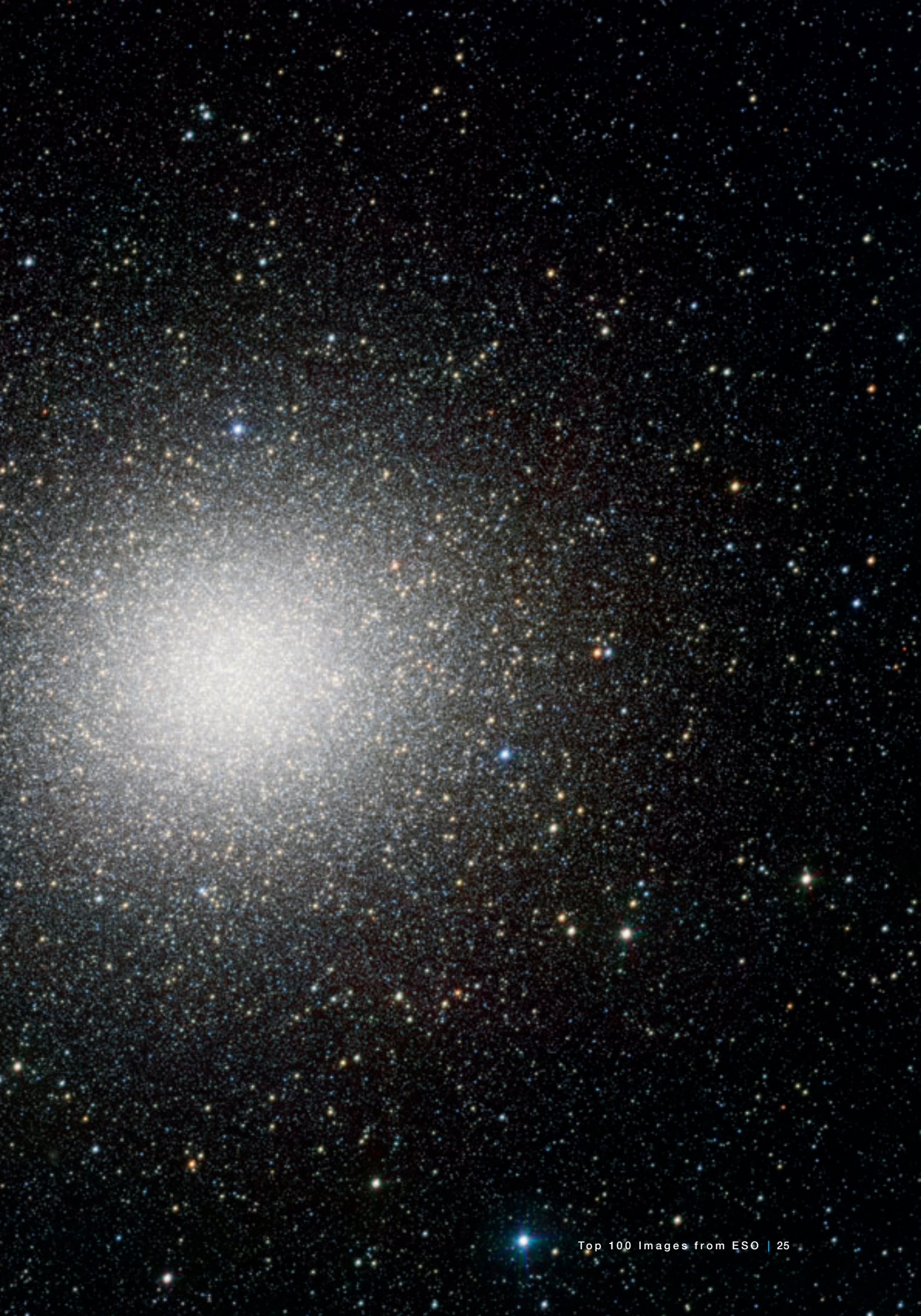
This broad panorama of the Carina Nebula, a region of massive star formation in the southern skies, was taken in infrared light using the HAWK-I camera on ESO’s Very Large Telescope. Many previously hidden features, scattered across a spectacular celestial landscape of gas, dust and young stars, have emerged.

Credit: ESO/T. Preibisch

VST image of the giant globular cluster Omega Centauri

The second released VST image may be the best portrait of the globular star cluster Omega Centauri ever made. Omega Centauri, in the constellation of Centaurus (The Centaur), is the largest globular cluster in the sky, but the very wide field of view of VST and its powerful camera OmegaCAM can encompass even the faint outer regions of this spectacular object. This view includes about 300 000 stars. The data were processed using the VST-Tube system developed by A. Grado and collaborators at the INAF-Capodimonte Observatory.

Credit: ESO/INAF-VST/OmegaCAM. Acknowledgement: A. Grado/INAF-Capodimonte Observatory



Messier 78: a reflection nebula in Orion

This new image of the reflection nebula Messier 78 was captured using the Wide Field Imager camera on the MPG/ESO 2.2-metre telescope at the La Silla Observatory, Chile. This colour picture was created from many monochrome exposures taken through blue, yellow/green and red filters, supplemented by exposures through a filter that isolates light from glowing hydrogen gas. The total exposure times were 9, 9, 17.5 and 15.5 minutes per filter, respectively.

Credit: ESO/Igor Chekalin

Panoramic view of the WR 22 and Eta Carinae regions of the Carina Nebula

This spectacular panoramic view combines a new image of the field around the Wolf–Rayet star WR 22 in the Carina Nebula (right) with an earlier picture of the region around the unique star Eta Carinae in the heart of the nebula (left). The picture was created from images taken with the Wide Field Imager on the MPG/ESO 2.2-metre telescope at ESO's La Silla Observatory in Chile.

Credit: ESO

ALMA Site

An artist's impression of the Atacama Large Millimeter/submillimeter Array (ALMA) site on the Chajnantor plain of the Chilean Andes, 5000 metre above sea level. ALMA is the largest ground-based astronomy project in existence, and will be comprised of a giant array of 12-metre submillimetre quality antennas, with baselines of several kilometres. An additional, compact array of 7-metre and 12-metre antennas will complement the main array. Construction of ALMA started in 2003 and will be completed around 2012.

The ALMA project is an international collaboration between Europe, East Asia and North America in cooperation with the Republic of Chile.

Credit: ALMA (ESO/NAOJ/NRAO)/L. Calçada (ESO)

The hidden fires of the Flame Nebula

This image, the first to be released publicly from VISTA, the world's largest survey telescope, shows the spectacular star-forming region known as the Flame Nebula, or NGC 2024, in the constellation of Orion (the Hunter) and its surroundings. In views of this evocative object in visible light the core of the nebula is completely hidden behind obscuring dust, but in this VISTA view, taken in infrared light, the cluster of very young stars at the object's heart is revealed. The wide-field VISTA view also includes the glow of the reflection nebula NGC 2023, just below centre, and the ghostly outline of the Horsehead Nebula (Barnard 33) towards the lower right. The bright bluish star towards the right is one of the three bright stars forming the Belt of Orion. The image was created from VISTA images taken through J, H and Ks filters in the near-infrared part of the spectrum. The image shows about half the area of the full VISTA field and is about 40 x 50 arcminutes in extent. The total exposure time was 14 minutes.

Credit: ESO/J. Emerson/VISTA.
Acknowledgment: Cambridge Astronomical Survey Unit

Early Morning on Paranal

This amazing panorama shows the observing platform of ESO's Very Large Telescope (VLT) on Cerro Paranal, in Chile. Taken in the early morning, with the Moon still high in the sky, the air of peace and tranquility is in stark contrast to the frantic activity at the observatory. The four giant 8.2-metre Unit Telescopes of the VLT are all targeting specific celestial objects, helping astronomers in their daily quest to understand the mysteries of the Universe. A laser is fired from Unit Telescope 4, Yepun, to help the adaptive optics system of the telescope, and counteract the blurring effect of the atmosphere, allowing very sharp images to be obtained. Meanwhile, three of the four smaller 1.8-metre Auxiliary Telescopes are working together in interferometric mode to obtain an even more detailed view of a different cosmic object.

Credit: ESO/H.H. Heyer

Rare 360-degree Panorama of the Southern Sky

The Milky Way arches across this rare 360-degree panorama of the night sky above the Paranal platform, home of ESO's Very Large Telescope. The image was made from 37 individual frames with a total exposure time of about 30 minutes, taken in the early morning hours. The Moon is just rising and the zodiacal light shines above it, while the Milky Way stretches across the sky opposite the observatory. The open telescope domes of the world's most advanced ground-based astronomical observatory are all visible in the image: the four smaller 1.8-metre Auxiliary Telescopes that can be used together in the interferometric mode, and the four giant 8.2-metre Unit Telescopes. To the right in the image and below the arc of the Milky Way, two of our galactic neighbours, the Small and Large Magellanic Clouds, can be seen.

Credit: ESO/H.H. Heyer

370-million-pixel starscape of the Lagoon Nebula

The third image of ESO's GigaGalaxy Zoom project is an amazing vista of the Lagoon Nebula taken with the 67-million-pixel Wide Field Imager attached to the MPG/ESO 2.2-metre telescope at the La Silla Observatory in Chile. The image covers more than one and a half square degree — an area eight times larger than that of the Full Moon — with a total of about 370 million pixels. It is based on images acquired using three different broadband filters (B, V, R) and one narrow-band filter (H-alpha).

Credit: ESO

The Milky Way panorama

This magnificent 360-degree panoramic image, covering the entire southern and northern celestial sphere, reveals the cosmic landscape that surrounds our tiny blue planet. This gorgeous starscape serves as the first of three extremely high-resolution images featured in the GigaGalaxy Zoom project, launched by ESO within the framework of the International Year of Astronomy 2009. The plane of our Milky Way Galaxy, which we see edge-on from our perspective on Earth, cuts a luminous swath across the image. The projection used in GigaGalaxy Zoom place the viewer in front of our Galaxy with the Galactic Plane running horizontally through the image — almost as if we were looking at the Milky Way from the outside. From this vantage point, the general components of our spiral galaxy come clearly into view, including its disc, marbled with both dark and glowing nebulae, which harbours bright, young stars, as well as the Galaxy's central bulge and its satellite galaxies. As filming extended over several months, objects from the Solar System came and went through the star fields, with bright planets such as Venus and Jupiter.

Credit: ESO/S. Brunier

The Omega Nebula

Three-colour composite image of the Omega Nebula (Messier 17, or NGC 6618), based on images obtained with the EMMI instrument on the ESO 3.58-metre New Technology Telescope at the La Silla Observatory. North is down and East is to the right in the image. It spans an angle equal to about one third the diameter of the Full Moon, corresponding to about 15 light-years at the distance of the Omega Nebula. The three filters used are B (blue), V ("visual", or green) and R (red).

Credit: ESO

Centaurus A

Colour composite image of Centaurus A, revealing the lobes and jets emanating from the active galaxy's central black hole. This is a composite of images obtained with three instruments, operating at very different wavelengths. The 870-micron submillimetre data, from LABOCA on APEX, are shown in orange. X-ray data from the Chandra X-ray Observatory are shown in blue. Visible light data from the Wide Field Imager (WFI) on the MPG/ESO 2.2-metre telescope located at La Silla, Chile, show the background stars and the galaxy's characteristic dust lane in close to "true colour".

Credit: ESO/WFI (Optical); MPIfR/ESO/APEX/A.Weiss et al. (Submillimetre); NASA/CXC/CfA/R.Kraft et al. (X-ray)

Glowing Stellar Nurseries

Colour composite image of RCW120. It reveals how an expanding bubble of ionised gas about ten light-years across is causing the surrounding material to collapse into dense clumps where new stars are then formed. The 870-micron submillimetre-wavelength data were taken with the LABOCA camera on the 12-metre Atacama Pathfinder Experiment (APEX) telescope. Here, the submillimetre emission is shown as the blue clouds surrounding the reddish glow of the ionised gas (shown with data from the SuperCosmos H-alpha survey). The image also contains data from the Second Generation Digitized Sky Survey (I-band shown in blue, R-band shown in red).

Credit: ESO/APEX/DSS2/SuperCosmos/Deharveng(LAM)/Zavagno(LAM)

The R Coronae Australis region imaged with the Wide Field Imager at La Silla

The nearby star-forming region around the star R Coronae Australis imaged by the Wide Field Imager (WFI) on the MPG/ESO 2.2-metre telescope at ESO's La Silla Observatory in Chile. This picture, which covers a field of 33.7 x 31.9 arcminutes (about the diameter of the full Moon), is a combination of twelve CCD frames, 67 megapixels each, taken through B, V and R filters, with four exposures of five minutes each.

Credit: ESO

The Eagle Nebula

Three-colour composite mosaic image of the Eagle Nebula (Messier 16, or NGC 6611), based on images obtained with the Wide-Field Imager camera on the MPG/ESO 2.2-metre telescope at the La Silla Observatory. At the centre, the so-called “Pillars of Creation” can be seen. This wide-field image shows not only the central pillars, but also several others in the same star-forming region, as well as a huge number of stars in front of, in, or behind the Eagle Nebula. The cluster of bright stars to the upper right is NGC 6611, home to the massive and hot stars that illuminate the pillars. The “Spire” — another large pillar — is in the middle left of the image. This image is a composite of 3 filters in the visible range: B (blue), V (green) and R (red).

Credit: ESO

A Pool of Distant Galaxies

The Chandra Deep Field South, observed in the U-, B-, and R-bands with ESOs VIMOS and WFI instruments. The U-band VIMOS observations were made over a period of 40 hours and constitute the deepest image ever taken from the ground in the U-band. The image covers a region of 14.1 x 21.6 arcminutes on the sky and shows galaxies that are 1 billion times fainter than can be seen by the unaided eye. The VIMOS R-band image was assembled by the ESO/GOODS team from archival data, while the WFI B-band image was produced by the GABODS team.

Credit: ESO/Mario Nonino, Piero Rosati and the ESO GOODS Team

VISTA's infrared view of the Cat's Paw Nebula

Infrared view of the Cat's Paw Nebula (NGC 6334) taken by VISTA. NGC 6334 is a vast region of star formation about 5500 light-years from Earth in the constellation of Scorpius. The whole gas cloud is about 50 light-years across. NGC 6334 is one of the most active nurseries of young massive stars in our galaxy, some nearly ten times the mass of our Sun and most born in the last few million years. The images were taken through Y, J and Ks filters (shown as blue, green and red respectively) and the exposure time was five minutes per filter. The field of view is about one degree across.

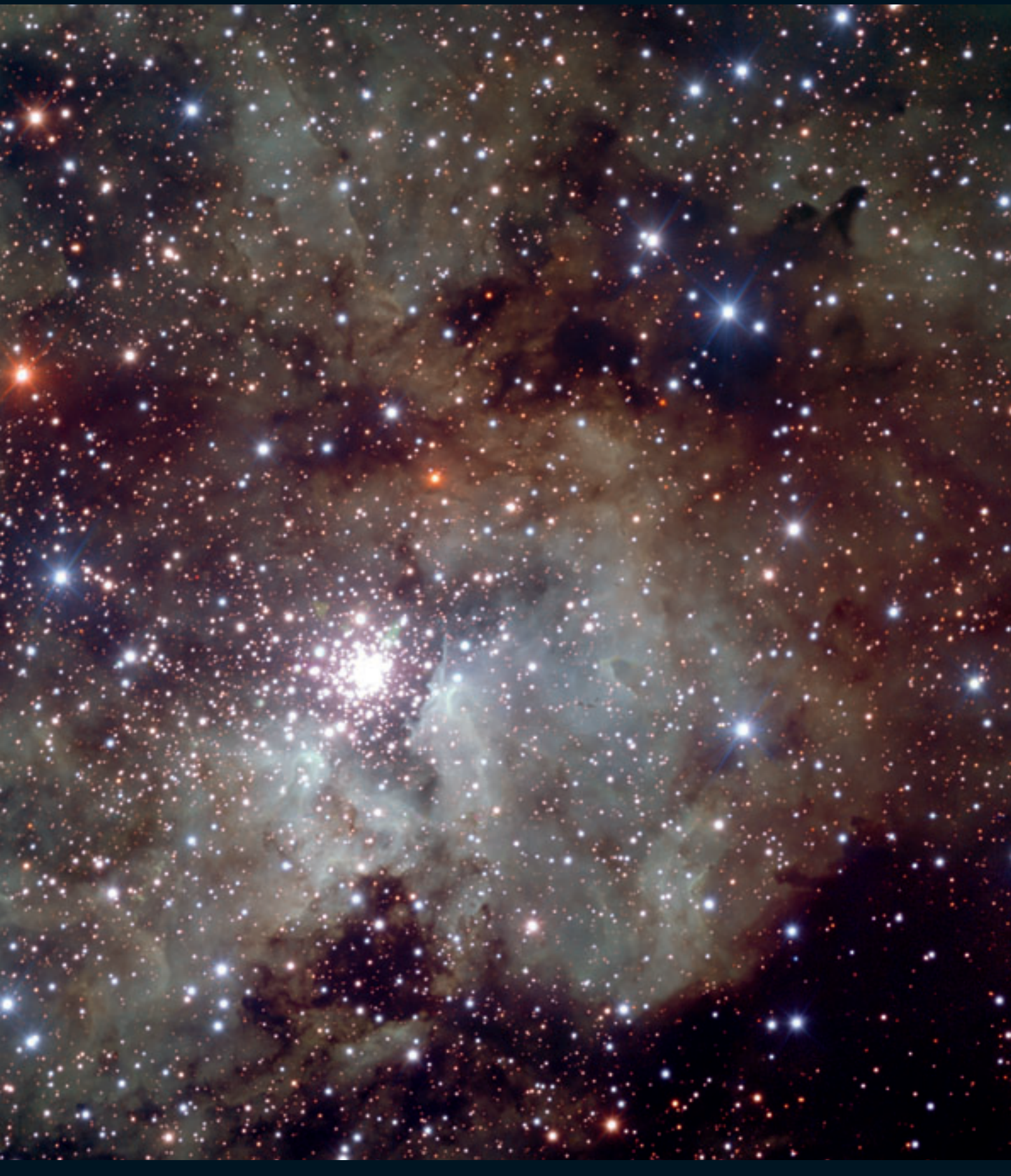
Credit: ESO/J. Emerson/VISTA
Acknowledgment: Cambridge Astronomical Survey Unit

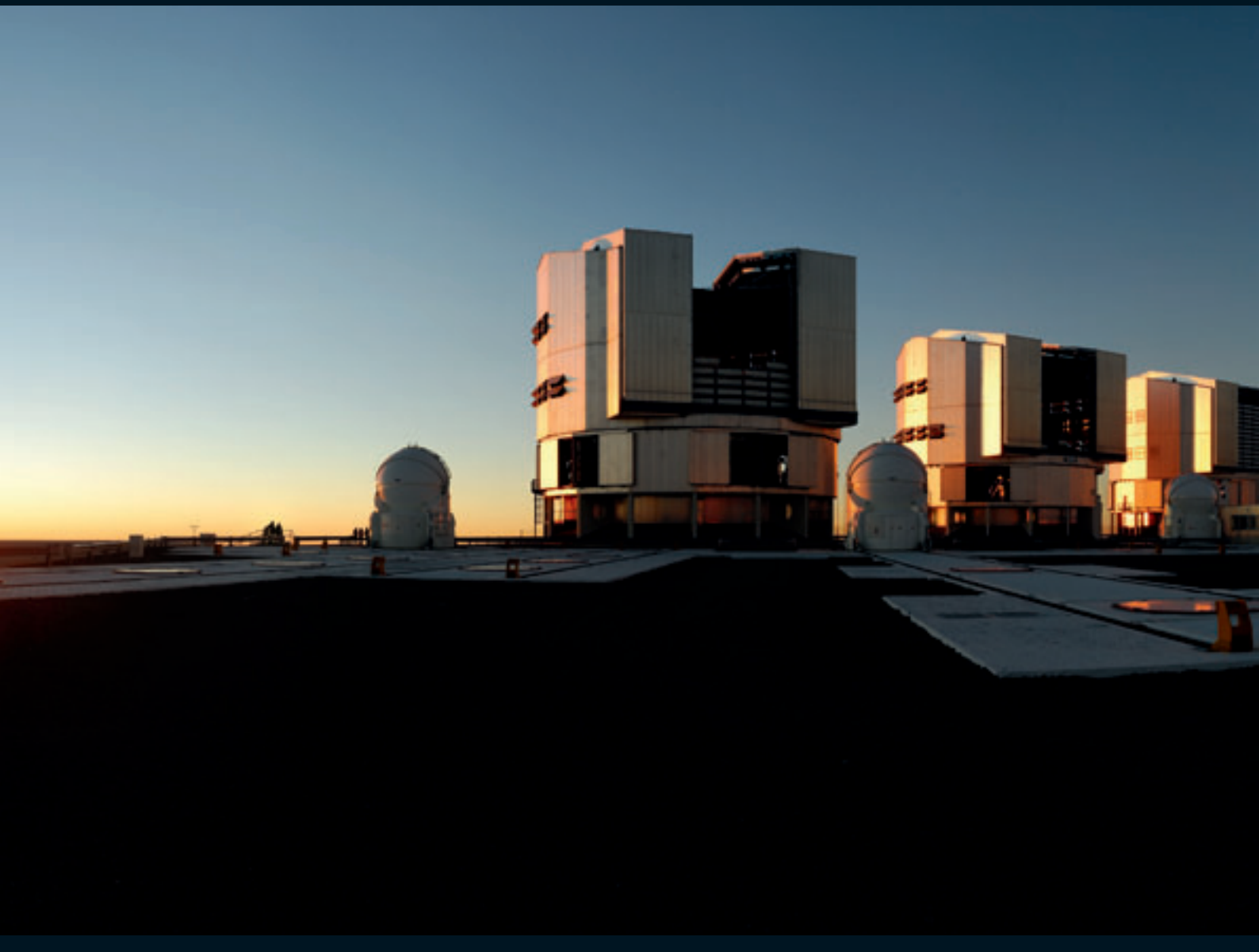
Stellar nursery NGC 3603

NGC 3603 is a starburst region: a cosmic factory where stars form frantically from the nebula's extended clouds of gas and dust. Located 22 000 light-years away from the Sun, it is the closest region of this kind known in our galaxy, providing astronomers with a local test bed for studying the intense star formation processes, very common in other galaxies, but hard to observe in detail because of their large distance.

The newly released image, obtained with the FORS instrument attached to one of the four 8.2-metre VLT Unit Telescopes at Cerro Paranal, Chile, is a three-colour combination of exposures acquired through visible and near-infrared (V, R, I) filters. This image portrays a wider field around the stellar cluster and reveals the rich texture of the surrounding clouds of gas and dust. The field of view is 7 arcminutes wide.

Credit: ESO





Sunset over Paranal Panorama

The Very Large Telescope (VLT) on the 2600-metre-high Cerro Paranal is ESOs premier site for observations in the visible and infrared light. It is located in the Chilean Atacama desert. All four unit telescopes of 8.2-metre diameter are individually in operation with a large collection of instruments and have already made amazing scientific discoveries.

The VLT offers also the possibility of combining coherently the light from the four UTs to work as an interferometer. The Very Large Telescope Interferometer (VLTI), with its own suite of instruments, ultimately providing imagery at the milli-arcsecond level as well as astrometry at 10 micro-arcsecond precision. In addition to the 8.2-metre diameter telescopes, the VLTI is complemented with four Auxiliary Telescopes (AT) of 1.8-metre diameter to improve its imaging capabilities and enable full nighttime use on a year-round basis.

The enclosure of the yet to come VLT Survey Telescope (2.6-metre diameter) is visible in the centre of the image.

Credit: ESO/F. Kamphues

The Trifid Nebula

The massive star factory known as the Trifid Nebula was captured in all its glory with the Wide-Field Imager camera attached to the MPG/ESO 2.2-metre telescope at ESO's La Silla Observatory in northern Chile. So named for the dark dust bands that trisect its glowing heart, the Trifid Nebula is a rare combination of three nebulae types that reveal the fury of freshly formed stars and point to more star birth in the future. The field of view of the image is approximately 13 x 17 arcminutes.

Credit: ESO

APEX at Chajnantor

While ALMA is currently under construction, astronomers are already doing millimetre and submillimetre astronomy at Chajnantor, with the Atacama Pathfinder Experiment (APEX). This is a new-technology 12-metre telescope, based on an ALMA prototype antenna, and operating at the ALMA site. It has modified optics and an improved antenna surface accuracy, and is designed to take advantage of the excellent sky transparency working with wavelengths in the 0.2 to 1.4 mm range.

Credit: ESO/H.H.Heyer

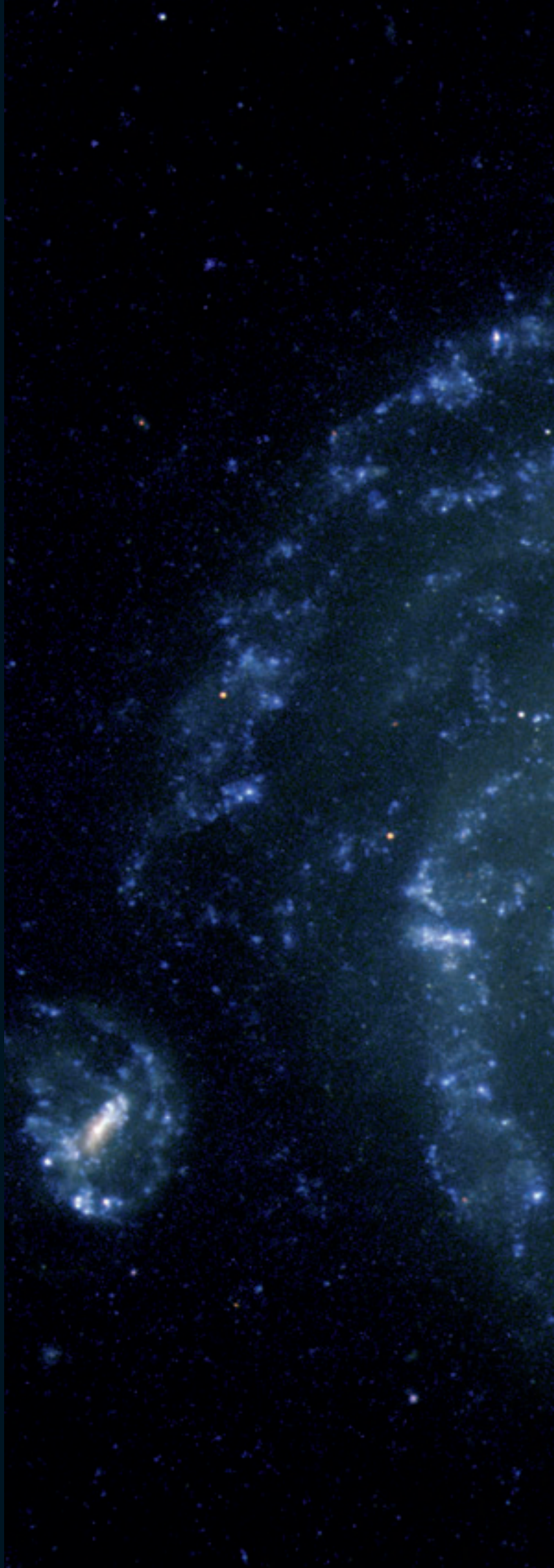
Spiral galaxy NGC 1232

This spectacular image of the large spiral galaxy NGC 1232 was obtained on 21 September, 1998, during a period of good observing conditions. It is based on three exposures in ultra-violet, blue and red light, respectively. The colours of the different regions are well visible: the central areas contain older stars of reddish colour, while the spiral arms are populated by young, blue stars and many star-forming regions. Note the distorted companion galaxy on the left side, shaped like the greek letter “theta”.

NGC 1232 is located 20° south of the celestial equator, in the constellation Eridanus (The River). The distance is about 100 million light-years, but the excellent optical quality of the VLT and FORS allows us to see an incredible wealth of details. At the indicated distance, the edge of the field shown corresponds to about 200 000 light-years, or about twice the size of the Milky Way galaxy.

The image is a composite of three images taken behind three different filters: U (360 nm; 10 min), B (420 nm; 6 min) and R (600 nm; 2:30 min) during a period of 0.7 arcseconds seeing. The field shown measures 6.8 x 6.8 arcminutes. North is up; East is to the left.

Credit: ESO



VLT looks into The Eyes of the Virgin

This striking image, taken with the FORS2 instrument on the Very Large Telescope, shows a beautiful yet peculiar pair of galaxies, NGC 4438 and NGC 4435, nicknamed The Eyes. The larger of these, at the top of the picture, NGC 4438, is thought to have once been a spiral galaxy that was strongly deformed by collisions in the relatively recent past. The two galaxies belong to the Virgo Cluster and are about 50 million light-years away.

Credit: ESO

The E-ELT (artist’s impression)

Artist’s impression of the European Extremely Large Telescope (E-ELT). The E-ELT will be the largest optical/infrared telescope in the world — the world’s biggest eye on the sky.

Credit: ESO

Eclipsed Moon, Striking Night Sky

A total eclipse of the Moon is an impressive spectacle. But it also provides another viewing opportunity: a dark, moonlight-free starry sky. At Cerro Paranal in the Chilean Atacama Desert, one of the most remote places in the world, the distance from sources of light pollution makes the night sky all the more remarkable during a total lunar eclipse.

This panoramic photo, taken by ESO Photo Ambassador Yuri Beletsky, shows the view of the starry sky from the site of ESO's Very Large Telescope (VLT) at Cerro Paranal during the total lunar eclipse of 21 December 2010. The reddish disc of the Moon is seen on the right of the image, while the Milky Way arches across the heavens in all its beauty. Another faint glow of light is also visible, surrounding the brilliant planet Venus in the bottom left corner of the picture. This phenomenon, known as zodiacal light, is produced by sunlight reflecting off dust in the plane of the planets. It is so faint that it's normally obscured by moonlight or light pollution.

During a total lunar eclipse, the Earth's shadow blocks direct sunlight from the Moon. The Moon is still visible, red in colour because only light rays at the red end of the spectrum are able to reach the Moon after being redirected through the Earth's atmosphere (the blue and green light rays are scattered much more strongly).

Interestingly the Moon, which appears above one of VLT's Unit Telescopes (UT2), was being observed by UT1 that night. UT1 and UT2 are also known as Antu (meaning The Sun in Mapudungun, one of Chile's native languages) and Kueyen (The Moon), respectively.

Credit: ESO/Y. Beletsky

The VLT in Action

The ESO Very Large Telescope (VLT) during observations. In this picture, taken from the VLT platform looking north-northwest at twilight, the four 8.2-metre Unit Telescopes (UTs) are visible. From left to right, Antu, Kueyen, Melipal and Yepun, the Mapuche names for the VLT's giant telescopes. In front of the UTs are the four 1.8-metre Auxiliary Telescopes (ATs), entirely dedicated to interferometry, a technique which allows astronomers to see details up to 25 times finer than with the individual telescopes. The configuration of the ATs can be changed by moving them across the platform between 30 different observing positions. One of these positions is visible in the foreground, covered by a hexagonal pad. A reddish laser beam is being launched from UT4 (Yepun) to create an artificial star at an altitude of 90 km in the Earth´s mesosphere. This Laser Guide Star (LGS) is part of the Adaptive Optics system, which allows astronomers to remove the effects of atmospheric turbulence, producing images almost as sharp as if the telescope were in space. The bluish compact group of stars visible to the right of the laser beam is the Pleiades open cluster.

Credit: ESO/S. Brunier

ESO's Very Large Telescope Peers into a Distant Nebula

Astronomers using data from ESO's Very Large Telescope (VLT), at the Paranal Observatory in Chile, have made an impressive composite of the nebula Messier 17, also known as the Omega Nebula or the Swan Nebula. The painting-like image shows vast clouds of gas and dust illuminated by the intense radiation from young stars.

The image shows a central region about 15 light-years across, although the entire nebula is even larger, about 40 light-years in total. Messier 17 is in the constellation of Sagittarius (the Archer), about 6000 light-years from Earth. It is a popular target for amateur astronomers, who can obtain good quality images using small telescopes. These deep VLT observations were made at near-infrared wavelengths with the ISAAC instrument. The filters used were J (1.25 µm, shown in blue), H (1.6 µm, shown in green), and K (2.2 µm, shown in red). In the centre of the image is a cluster of massive young stars whose intense radiation makes the surrounding hydrogen gas glow. To the lower right of the cluster is a huge cloud of molecular gas. At visible wavelengths, dust grains in the cloud obscure our view, but by observing in infrared light, the glow of the hydrogen gas behind the cloud can be seen shining faintly through. Hidden in this region, which has a dark reddish appearance, the astronomers found the opaque silhouette of a disc of gas and dust. Although it is small in this image, the disc has a diameter of about 20 000 AU, dwarfing our Solar System (1 AU is the distance between the Earth and the Sun). It is thought that this disc is rotating and feeding material onto a central protostar — an early stage in the formation of a new star.

Credit: ESO/R. Chini

Infrared VISTA view of a stellar nursery in Monoceros

This dramatic infrared image shows the nearby star formation region Monoceros R2, located some 2700 light-years away in the constellation of Monoceros (the Unicorn). The picture was created from exposures in the near infrared bands Y, J and Ks taken by the VISTA survey telescope at ESO's Paranal Observatory. Monoceros R2 is an association of massive hot young stars illuminating a beautiful collection of reflection nebulae, embedded in a large molecular cloud.

Credit: ESO/J. Emerson/VISTA. Acknowledgment: Cambridge Astronomical Survey Unit

Paranal Platform After Sunset

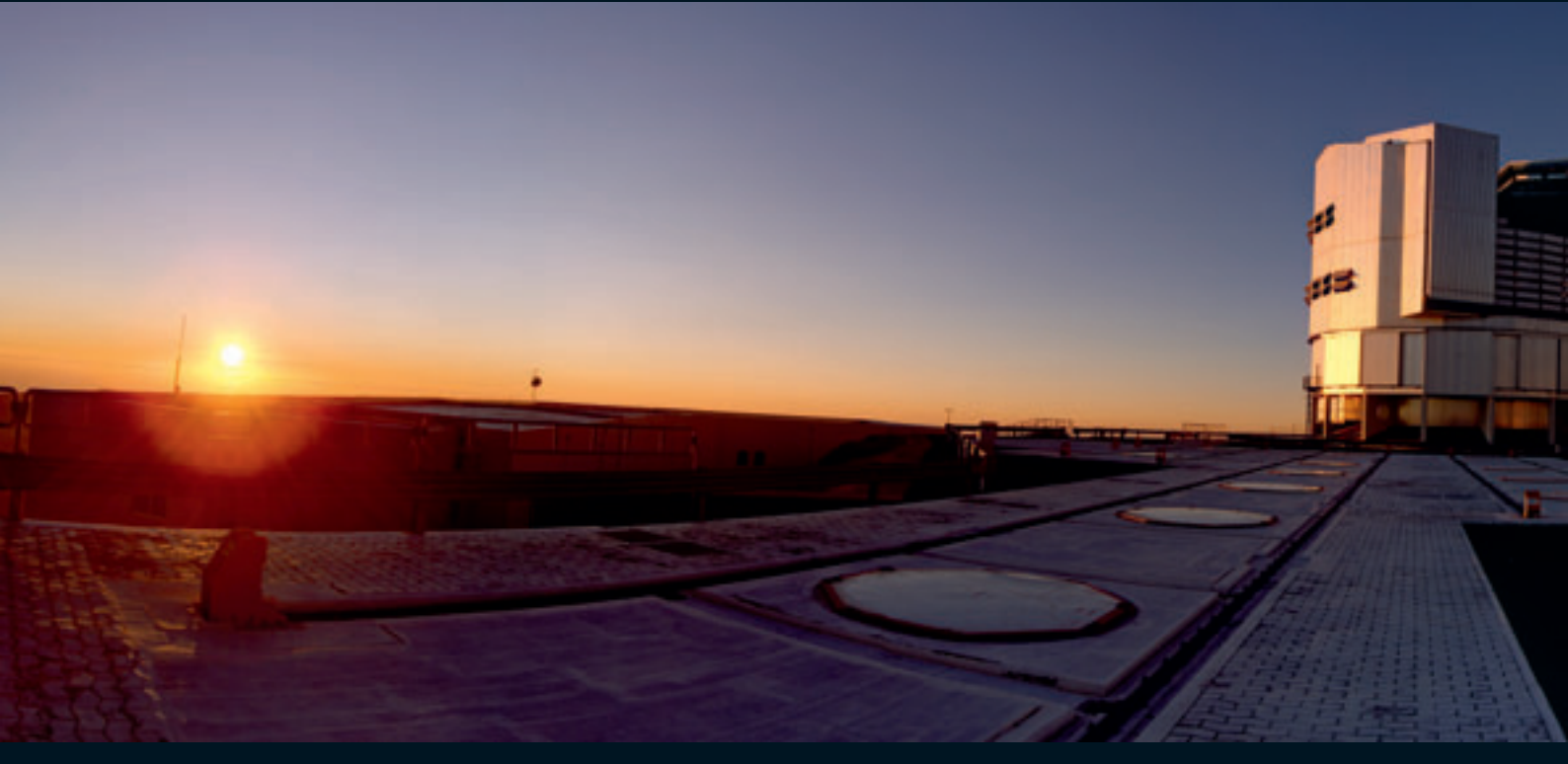
This image of the Paranal platform was taken right after sunset. The four Unit Telescopes are ready to start the observations.

Credit: ESO/H.H.Heyer

Panorama of Sunset on Paranal

Magnificent sunset view on the telescopes of ESO's Very Large Telescope (VLT) observatory on Cerro Paranal, marking the beginning of the frantic activity of the astronomers observing the night sky.

Credit: ESO/Y. Beletsky

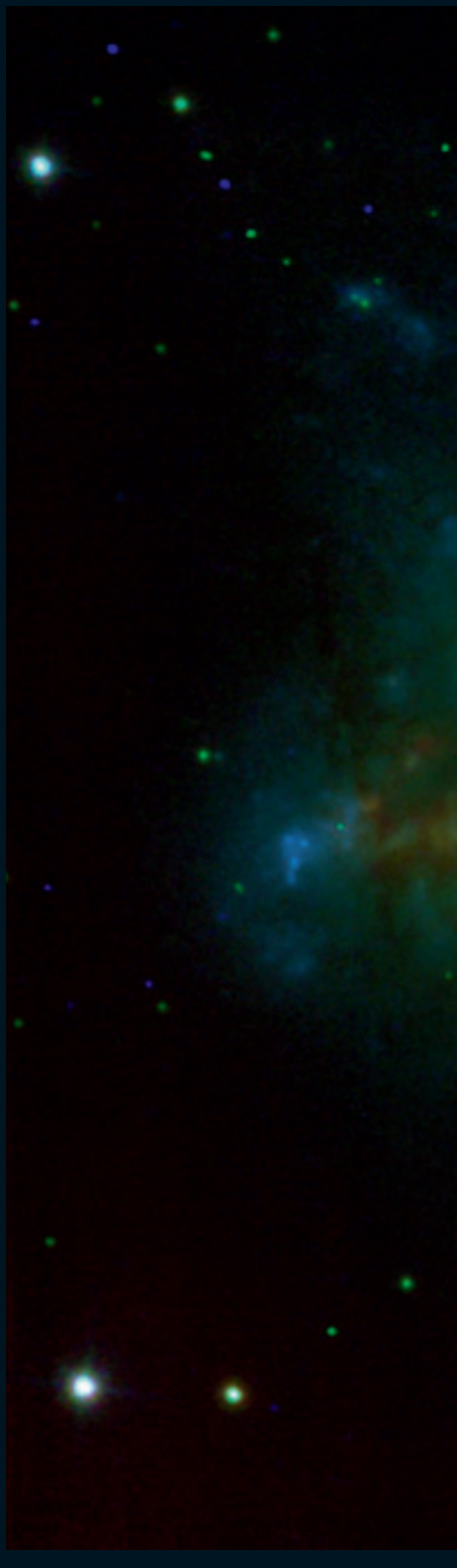


The Tinker Bell Triplet

Using ESO's Very Large Telescope, an international team of astronomers has discovered a stunning rare case of a triple merger of galaxies. This system, which astronomers have dubbed 'The Bird' — although it also bears resemblance with a cosmic Tinker Bell — is composed of two massive spiral galaxies and a third irregular galaxy.

In this image, a 30-min VLT/NACO K-band exposure has been combined with archive HST/ACS B and I-band images to produce a three-colour image of the 'Bird' interacting galaxy system. The NACO image has allowed astronomers to not only see the two previously known galaxies, but to identify a third, clearly separate component, an irregular, yet fairly massive galaxy that seems to form stars at a frantic rate.

Credit: ESO



Portrait of a Dramatic Stellar Crib

One square degree image of the Tarantula Nebula and its surroundings. The spidery nebula is seen in the upper-centre of the image. Slightly to the lower-right, a web of filaments harbours the famous supernova SN 1987A (see below). Many other reddish nebulae are visible in the image, as well as a cluster of young stars on the left, known as NGC 2100. Technical information: the image is based on observations carried out by Joao Alves (Calar Alto, Spain), Benoit Vandame and Yuri Beletski (ESO) with the Wide Field Imager (WFI) at the 2.2-metre telescope on La Silla. These data consist of a 2 x 2 WFI mosaic in the B- and V-bands, and in the Hα and [O III] narrow bands. The data were first processed with the ESO/MVM pipeline by the Advanced Data Products (ADP) group at ESO.

Credit: ESO/R. Fosbury (ST-ECF)

The Topsy-Turvy Galaxy NGC 1313

The central parts of the starburst galaxy NGC 1313. The very active state of this galaxy is very evident from the image, showing many star formation regions. A great number of supershell nebulae, that is, cocoon of gas inflated and etched by successive bursts of star formation, are visible. The green nebulosities are regions emitting in the ionised oxygen lines and may harbour clusters with very hot stars. This colour-composite is based on images obtained with the FORS1 instrument on one of the 8.2-metre Unit Telescope of ESO's Very Large Telescope, located at Cerro Paranal. The data were obtained in the night of 16 December 2003, through different broad- (R, B, and z) and narrow-band filters (Hα, O I, and O III).

Credit: ESO

The Orion Nebula

This photo shows a colour composite mosaic image of the central part of the Orion Nebula, based on 81 images obtained with the infrared multi-mode ISAAC instrument on the ESO Very Large Telescope (VLT) at the Paranal Observatory. The famous Trapezium stars are seen near the centre and the photo also shows the associated cluster of about 1000 stars, approximately one million years old.

Credit: ESO/M. McCaughrean et al. (AIP)

ESO Headquarters at Sunset

This panoramic photograph shows the European Southern Observatory's Headquarters in Garching, near Munich, Germany. The image shows the view from the roof of the main building just after sunset. This is the scientific, technical and administrative centre for ESO's operations, and the base from which many astronomers conduct their research. The scientists, technicians and administrators who work here come from many different backgrounds, but all have one thing in common: a passion for astronomy.

ESO is the foremost intergovernmental astronomy organisation in Europe and the world's most productive astronomical observatory. ESO operates telescopes at three observing sites in Chile: La Silla, Paranal and Chajnantor. In addition, Cerro Armazones, near Paranal has been selected as the site for the European Extremely Large Telescope (E-ELT).

ESO provides state-of-the-art research facilities to astronomers and is supported by Austria, Belgium, Brazil, the Czech Republic, Denmark, Finland, France, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom. The ESO Headquarters reflects this multicultural spirit of cooperation and is the workplace for astronomers from around the globe.

Credit: ESO/H. Heyer

Close-up of the drama of star formation

This very detailed enhanced-colour image from ESO's Very Large Telescope shows the dramatic effects of very young stars on the dust and gas from which they were born in the star-forming region NGC 6729. The baby stars are invisible in this picture, being hidden behind dust clouds at the upper left of the picture, but material they are ejecting is crashing into the surroundings at speeds of that can be as high as one million kilometres per hour. This picture was taken by the FORS1 instrument and records the scene in the light of glowing hydrogen and sulphur.

Credit: ESO/Sergey Stepanenko

Exoplanet Hunters at La Silla

In the search for distant worlds, few telescopes have had as much success as ESO's 3.6-metre telescope and the Swiss 1.2-metre Leonhard Euler Telescope, both of which are shown in this image.

The 3.6-metre telescope is home to HARPS (High Accuracy Radial velocity Planet Searcher), a spectrograph with unrivalled precision, and holder of many records in the field of exoplanet research, including the discovery of the least massive exoplanet, as well as of the smallest ever measured. Together with HARPS, the Leonhard Euler Telescope has allowed astronomers to find that six exoplanets from a larger sample of 27 were orbiting in the opposite direction to the rotation of their host star — providing an unexpected and serious challenge to current theories of planet formation.

At 2400 metres above sea level in the southern part of Chile's Atacama Desert, La Silla was ESO's first observation site. Along with the 3.6-metre telescope, it also hosts the New Technology Telescope (NTT) and the MPG/ESO 2.2-metre telescope as well as several national and smaller telescopes.

Credit: Iztok Boncina/ESO

Bird’s Eye View of the Very Large Telescope

A bird soaring over the remote, sparsely populated Atacama Desert in northern Chile — possibly the driest desert in the world — might be surprised to come upon the technological oasis of ESO’s Very Large Telescope (VLT) at Paranal. The world’s most advanced ground-based facility for astronomy, the site hosts four 8.2-metre Unit Telescopes, four 1.8-metre Auxiliary Telescopes, the VLT Survey Telescope (VST), and the 4.1-metre Visible and Infrared Survey Telescope for Astronomy (VISTA), seen in the distance on the next mountain peak over from the main platform.

This aerial view also shows other structures, including the Observatory Control Room building, on the main platform’s front edge.

Credit: ESO/G.Hüdepohl (atacamaphoto.com)

Paranal Observatory and the Volcano Llullaillaco

This marvellous aerial photograph of the home of ESO's Very Large Telescope (VLT), fully demonstrates the superb quality of the observing site. In the foreground we see the Paranal Observatory, located at an altitude of 2600 metres on mount Paranal in Chile. In the background we can see the snow-capped, 6720-metre-high volcano Llullaillaco, located a mind-boggling 190 km further East on the Argentinean border. This image is a testimony of the magnificent quality of the air and the ideal conditions for observing at this remote site.

Clearly visible in the image are the domes of the four giant 8.2-metre Unit Telescopes of the VLT, with the Control Building, where astronomers carry out the observations, in the foreground. Taken several years ago, this photograph does not show the Auxiliary Telescopes nor the dome of the soon to come VST Survey Telescope.

Credit: ESO/G.Hüdepohl (atacamaphoto.com)

Trailing stars above Paranal

The rotating sky above ESO's Very Large Telescope at Paranal. This long exposure shows the stars rotating around the southern (left) and northern (right) celestial poles, the celestial equator being in the middle of the photo — where the stars seem to move in a straight line. The motion of the VLT's enclosures are also visible.

Credit: ESO/Stéphane Guisard (www.eso.org/~sguisard)

Artist’s impression of Corot-7b

The exoplanet Corot-7b is so close to its Sun-like host star that it must experience extreme conditions. This planet has a mass five times that of Earth’s and is in fact the closest known exoplanet to its host star, which also makes it the fastest — it orbits its star at a speed of more than 750 000 kilometres per hour. The probable temperature on its “day-face” is above 2000 degrees, but minus 200 degrees on its night face. Theoretical models suggest that the planet may have lava or boiling oceans on its surface. Our artist has provided an impression of how it may look like if it were covered by lava. The sister planet, Corot-7c, is seen in the distance.

Credit: ESO/L. Calcada

Spiral Galaxy NGC 253

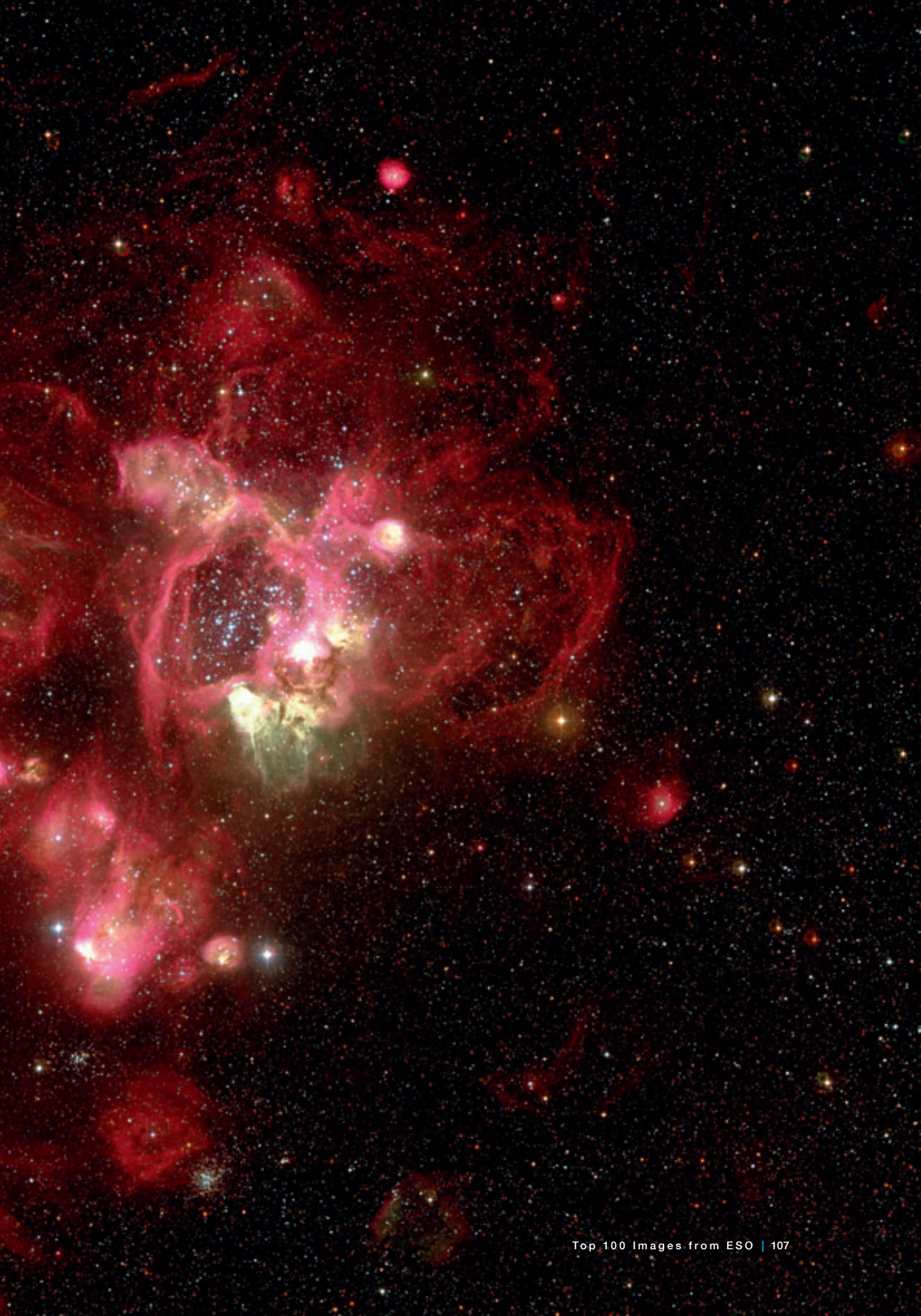
Measuring 70 000 light-years across and laying 13 million light-years away, the nearly edge-on spiral galaxy NGC 253 is revealed here in an image from the Wide Field Imager (WFI) of the MPG/ESO 2.2-metre telescope at the La Silla Observatory. The image is based on data obtained through four different filters (R, V, H-alpha and O III). North is up and East to the left. The field of view is 30 arcminutes.

Credit: ESO

N44 in the Large Magellanic Cloud

Southern part of the spectacular N44 region in the Large Magellanic Cloud. The green colour indicates areas that are particularly hot. The field measures 27.5 x 26.5 square arcminutes. North is up and East is left.

Credit: ESO



Really Hot Stars

This unique image shows AB7, one of the highest excitation nebulae in the Magellanic Clouds (MCs), two satellite galaxies of our own Milky Way. AB7 is a binary star, consisting of one WR-star — highly evolved massive star — and a mid-age massive companion of spectral type O. These exceptional stars have very strong stellar winds: they continuously eject energetic particles — like the "solar wind" from the Sun — but some 10 to 1000 million times more intensely than our star! These powerful winds exert an enormous pressure on the surrounding interstellar material and forcefully shape those clouds into "bubbles", well visible in the photos by their blue colour. AB7 is particularly remarkable: the associated huge nebula and He II region indicate that this star is one of the, if not **the**, hottest WR-star known so far, with a surface temperature in excess of 120 000 degrees! Just outside this nebula, a small network of green filaments is visible — they are the remains of another supernova explosion.

Credit: ESO

ALMA's World At Night

This panoramic view of the Chajnantor plateau, spanning about 180 degrees from north (on the left) to south (on the right) shows the antennas of the Atacama Large Millimeter/submillimeter Array (ALMA) ranged across the unearthly landscape. Some familiar celestial objects can be seen in the night sky behind them. These crystal-clear night skies explain why Chile is the home of not only ALMA, but also several other astronomical observatories. This image is just part of an even wider panorama of Chajnantor.

In the foreground, the 12-metre diameter ALMA antennas are in action, working as one giant telescope, during the observatory's first phase of scientific observations. On the far left, a cluster of smaller 7-metre antennas for ALMA's compact array can be seen illuminated. The crescent Moon, although not visible in this image, casts stark shadows over all the antennas.

In the sky above the antennas, the most prominent bright "star" — on the left of the image — is in fact the planet Jupiter. The gas giant is the third brightest natural object in the night sky, after the Moon and Venus. The Large and Small Magellanic Clouds can also be clearly seen on the right of the image. The Large Magellanic Cloud looks like a puff of smoke, just above the rightmost antenna. The Small Magellanic Cloud is higher in the sky, towards the upper-right corner. Both "clouds" are in fact dwarf irregular galaxies, orbiting the Milky Way galaxy, at distances of about 160 000 and 200 000 light-years respectively.

On the far left of the image, just left of the foreground antennas, is the elongated smudge of the Andromeda galaxy. This galaxy, more than ten times further away than the Magellanic Clouds, is our closest major neighbouring galaxy. It is also the largest galaxy in the Local Group — the group of about 30 galaxies which includes our own — and contains approximately one trillion stars, more than twice as many as the Milky Way. It is the only major galaxy visible with the naked eye. Even though only its most central region is apparent in this image, the galaxy spans the equivalent of six full Moons in the sky.

This photograph was taken by Babak Tafreshi, the latest ESO Photo Ambassador. Babak is also founder of The World At Night, a programme to create and exhibit a collection of stunning photographs and time-lapse videos of the world's most beautiful and historic sites against a nighttime backdrop of stars, planets and celestial events.

ALMA is being built on the Chajnantor plateau at an altitude of 5000 metres. The observatory, which started Early Science operations on 30 September 2011, will eventually consist of 66 antennas operating together as a single giant telescope. This international astronomy facility is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction, commissioning and operation of ALMA.

Credit: ESO/B. Tafreshi (twanight.org)

Antennae Galaxies composite of ALMA and Hubble observations

The Antennae Galaxies (also known as NGC 4038 and 4039) are a pair of distorted colliding spiral galaxies about 70 million light-years away, in the constellation of Corvus (The Crow). This view combines ALMA observations, made in two different wavelength ranges during the observatory's early testing phase, with visible-light observations from the NASA/ESA Hubble Space Telescope.

The Hubble image is the sharpest view of this object ever taken and serves as the ultimate benchmark in terms of resolution. ALMA observes at much longer wavelengths which makes it much harder to obtain comparably sharp images. However, when the full ALMA array is completed its vision will be up to ten times sharper than Hubble.

Most of the ALMA test observations used to create this image were made using only twelve antennas working together — far fewer than will be used for the first science observations — and much closer together as well. Both of these factors make the new image just a taster of what is to come. As the observatory grows, the sharpness, speed, and quality of its observations will increase dramatically as more antennas become available and the array grows in size. This is nevertheless the best submillimetre-wavelength image ever taken of the Antennae Galaxies and opens a new window on the submillimetre Universe.

While visible light — shown here mainly in blue — reveals the newborn stars in the galaxies, ALMA's view shows us something that cannot be seen at those wavelengths: the clouds of dense cold gas from which new stars form. The ALMA observations — shown here in red, pink and yellow — were made at specific wavelengths of millimetre and submillimetre light (ALMA bands 3 and 7), tuned to detect carbon monoxide molecules in the otherwise invisible hydrogen clouds, where new stars are forming.

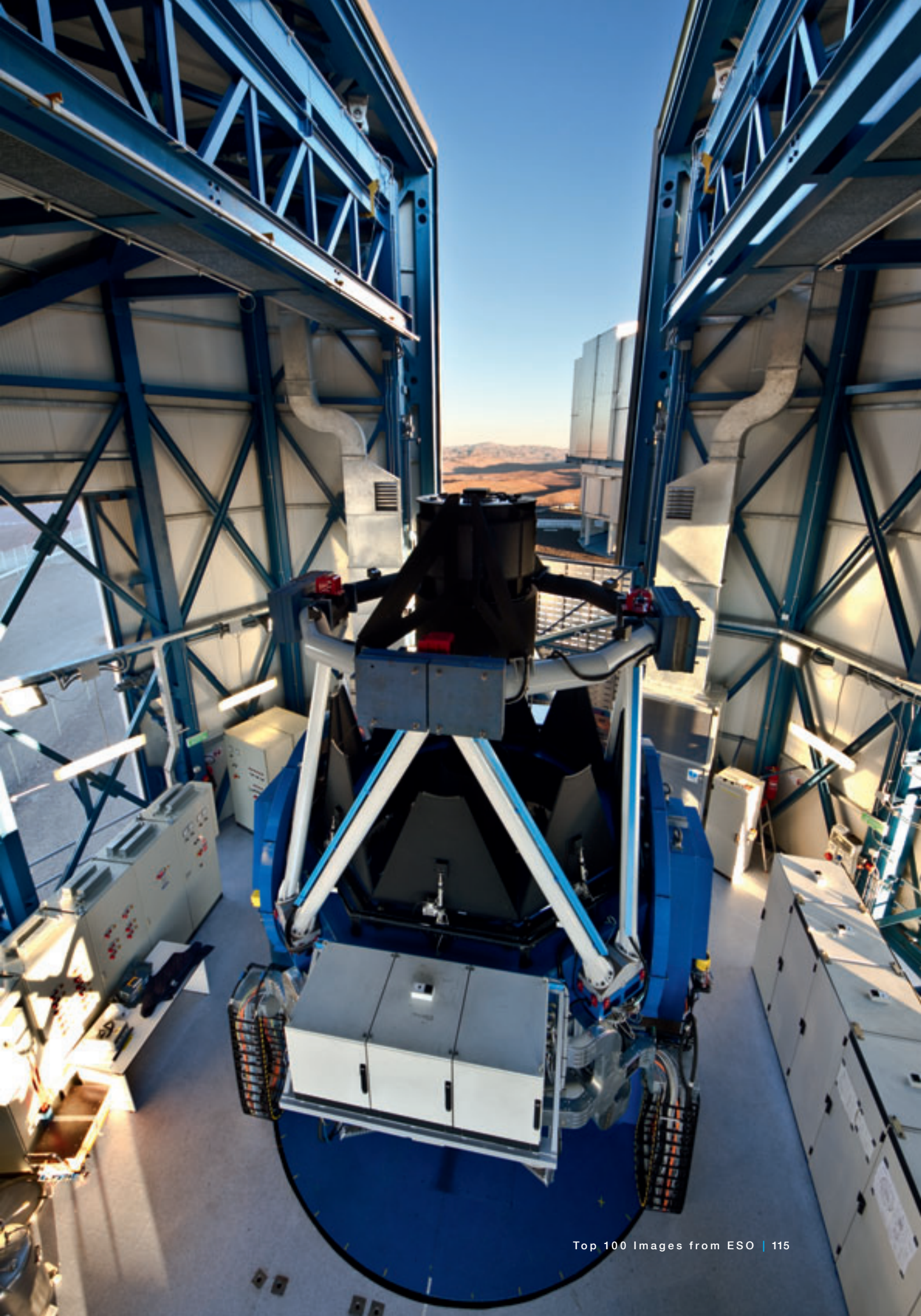
Massive concentrations of gas are found not only in the hearts of the two galaxies but also in the chaotic region where they are colliding. Here, the total amount of gas is billions of times the mass of the Sun — a rich reservoir of material for future generations of stars. Observations like these will be vital in helping us understand how galaxy collisions can trigger the birth of new stars. This is just one example of how ALMA reveals parts of the Universe that cannot be seen with visible-light and infrared telescopes.

Credit: ALMA (ESO/NAOJ/NRAO). Visible light image: the NASA/ESA Hubble Space Telescope

The VLT Survey Telescope: the largest telescope in the world designed for visible light sky surveys

The VLT Survey Telescope (VST) is the latest telescope to be added to ESO's Paranal Observatory in the Atacama Desert of northern Chile. It is housed in an enclosure immediately adjacent to the four VLT Unit Telescopes on the summit of Cerro Paranal. The VST is a 2.6-metre wide-field survey telescope with a field of view twice as broad as the full Moon. It is the largest telescope in the world dedicated to sky surveys in visible light. The VST was designed and built by the INAF–Osservatorio Astronomico di Capodimonte, Naples, Italy as part of a joint venture between INAF and ESO.

Credit: ESO/G. Lombardi

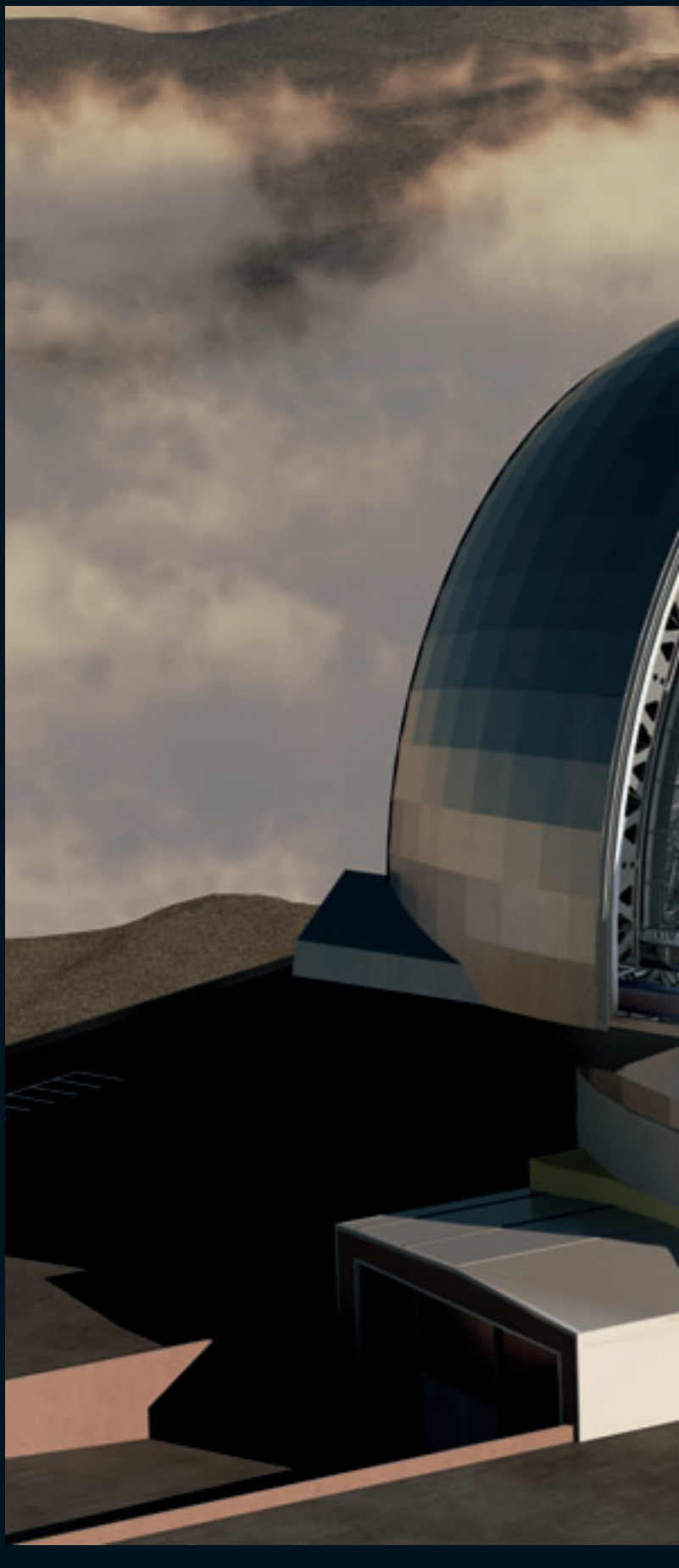


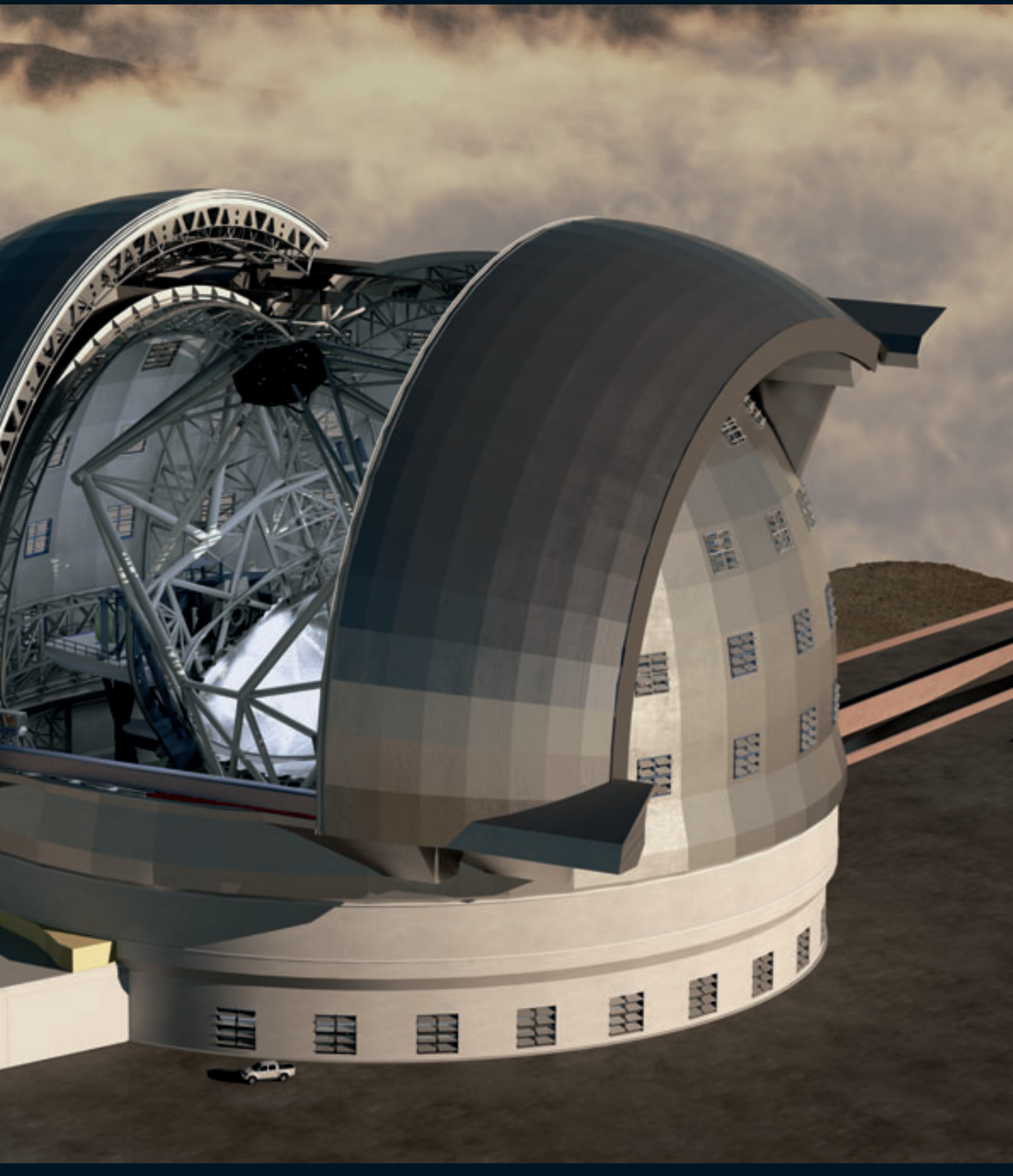
Latest Rendering of the E-ELT

A new architectural concept drawing of ESO's planned European Extremely Large Telescope (E-ELT) shows the telescope at work, with its dome open and its record-setting 40-metre-class primary mirror pointed to the sky. In this illustration, clouds float over the valley overlooked by the E-ELT's summit. The comparatively tiny pickup truck parked at the base of the E-ELT helps to give a sense of the scale of this massive telescope. The E-ELT dome will be similar in size to a football stadium, with a diameter at its base of over 100 metre and a height of over 80 metre.

Scheduled to begin operations early in the next decade, the E-ELT will help track down Earth-like planets around other stars in the "habitable zones" where life could exist — one of the Holy Grails of modern observational astronomy. The E-ELT will also make fundamental contributions to cosmology by measuring the properties of the first stars and galaxies and probing the nature of dark matter and dark energy.

Credit: Swinburne Astronomy Productions/ESO





One million stars — towards the dark heart of the Milky Way

With this remarkable VISTA mosaic we look deep into the dusty heart of our own Milky Way galaxy in the constellation of Sagittarius (the Archer). About one million stars are revealed in this picture, most of them not seen in visible light pictures. As well as absorbing light, the dust also scatters blue light from the distant stars and makes the central part of this huge starscape appear very red. This image is a mosaic created from VISTA images taken through Y, J and Ks filters in the near-infrared part of the spectrum. The image is about 2 degrees by 1.5 degrees in extent. The total exposure time for this mosaic was only 80 seconds.

Credit: ESO/VISTA. Acknowledgment: Cambridge Astronomical Survey Unit

Celestial Conjunction at Paranal

In the night sky over ESO's Very Large Telescope (VLT) observatory at Paranal, the Moon shines along with two bright companions: already aloft in the heavens and glowing in the centre of the image is Venus, Earth's closest planetary neighbour, and, to its right, the giant, though more distant planet, Jupiter. Such apparent celestial near misses — although the heavenly bodies are actually tens to hundreds of millions of kilometres apart — are called conjunctions.

Still other sights delight this night view at Paranal: the radiant, reddish plane of the Milky Way, smouldering on the horizon, and an 8.2-metre VLT Unit Telescope, along with a 1.8-metre Auxiliary Telescope, standing firmly on the ground.

Credit: ESO/Y. Beletsky

Group Portrait of the VLT with the Galaxy

The Milky Way, shining in its full splendour on top of the four Unit Telescopes and one of the Auxiliary Telescopes of ESO's Very Large Telescope (VLT).

Credit: ESO/Y.Beletsky

Spiral Galaxy NGC 4945

Seen edge-on, observations of NGC 4945 suggest that this hive of stars is a spiral galaxy much like our own Milky Way, with swirling, luminous arms and a bar-shaped centre. Sites of active star formation, known as H II regions, are seen prominently in the image, appearing bright pink. These resemblances aside, NGC 4945 has a brighter centre that likely harbours a supermassive black hole, which is devouring reams of matter and blasting energy out into space. NGC 4945 is about 13 million light-years away in the constellation of Centaurus (the Centaur) and is beautifully revealed in this image taken with data in five bands (B, V, R, H-alpha and S II) with the 2.2-metre MPG/ESO telescope at La Silla. The field of view is 30 x 30 arcminutes. North is up, East is to the left.

Credit: ESO

ALMA antennas under the Milky Way

Four antennas of the Atacama Large Millimeter/submillimeter Array (ALMA) gaze up at the star-filled night sky, in anticipation of the work that lies ahead. The Moon lights the scene on the right, while the band of the Milky Way stretches across the upper left.

ALMA is being constructed at an altitude of 5000 metre on the Chajnantor plateau in the Atacama Desert in Chile. This is one of the driest places on Earth and this dryness, combined with the thin atmosphere at high altitude, offers superb conditions for observing the Universe at millimetre and submillimetre wavelengths. At these long wavelengths, astronomers can probe, for example, molecular clouds, which are dense regions of gas and dust where new stars are born when a cloud collapses under its own gravity. Currently, the Universe remains relatively unexplored at submillimetre wavelengths, so astronomers expect to uncover many new secrets about star formation, as well as the origins of galaxies and planets, when ALMA is operational.

The ALMA project is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile.

This panorama was taken by ESO Photo Ambassador José Francisco Salgado.

Credit: ESO/José Francisco Salgado (josefrancisco.org)

Dark Sky and White Desert — Snow pays a rare visit to ESO's Paranal Observatory

The night sky above Cerro Paranal, the home of ESO's Very Large Telescope (VLT), is dark and dotted with the bright stars of the Milky Way, and more distant galaxies. But it is very rare to see the ground contrasting with the sky as markedly as in this photograph, which shows a gentle layer of white snow dotted with darker spots of the desert terrain beneath.

The picture was taken last week, shortly before sunrise, by ESO Photo Ambassador Yuri Beletsky, who works as an astronomer at the La Silla Paranal Observatory. He captured not only the beautiful snowy landscape of the Atacama and the mountaintop domes of the VLT, but also an incredible night sky. To the left of the VLT is a satellite trail, and to the right is the trail of a meteor.

Cerro Paranal is a 2600-metre-high mountain located in the Chilean Atacama Desert. It is a very dry place with humidity often dropping below 10 percent and rainfall of less than 10 millimetres per year. Snow, however, does occasionally fall in the desert, providing fleeting but magnificent views such as this one.

Credit: ESO/Y. Beletsky

Wide Field Imager view of the spiral galaxy NGC 247

This picture of the spiral galaxy NGC 247 was taken using the Wide Field Imager (WFI) at ESO's La Silla Observatory in Chile. NGC 247 is thought to lie about 11 million light-years away in the constellation of Cetus (The Whale). It is one of the closest galaxies to the Milky Way and a member of the Sculptor Group.

Credit: ESO

Starry La Silla

The stars rotate around the southern celestial pole during a night at ESO's La Silla Observatory in northern Chile. The fuzzy parts in the trails on the right are due to the Magellanic Clouds, two small galaxies neighbouring the Milky Way. The dome seen in the image hosts ESO's 3.6-metre telescope and is home to HARPS (High Accuracy Radial velocity Planet Searcher), the world's foremost exoplanet hunter. The rectangular building seen in the lower right of the image contains the 0.25-metre TAROT telescope, designed to react very quickly when a gamma-ray burst is detected. Other telescopes at La Silla include the 2.2-metre MPG/ESO telescope, and the 3.58-metre New Technology Telescope, the first telescope to use active optics and, as such, the precursor to all modern large telescopes. La Silla was ESO's first observing site and is still one of the premier observatories in the southern hemisphere.

Credit: Iztok Bončina/ESO

VISTA Magellanic Cloud Survey view of the Tarantula Nebula

This VISTA image shows the spectacular 30 Doradus star-forming region, also called the Tarantula Nebula. At its core is a large cluster of stars known as R 136, in which some of the most massive stars known are located. This infrared image, made with ESO's VISTA survey telescope, is from the VISTA Magellanic Cloud Survey. The project will scan a vast area — 184 square degrees of the sky (corresponding to almost one thousand times the apparent area of the full Moon), including our nearby neighbouring galaxies, the Large and Small Magellanic Clouds. The end result will be a detailed study of the star formation history and three-dimensional geometry of the Magellanic system. This image was created from images taken through Y, J and Ks filters in the near-infrared part of the spectrum (coloured blue, green and red respectively). The exposure times were 40, 47 and 81 minutes per filter respectively. The image covers a region of sky about 52 by 70 arcminutes.

Credit: ESO/M.-R. Cioni/VISTA Magellanic Cloud survey.
Acknowledgment: Cambridge Astronomical Survey Unit

Lying down on the VLT platform

This is roughly what we could see if we lie down on the VLT platform at night, when the Laser Guide Star (LSG) is being used. The laser beam, launched from VLTs 8.2-metre Yepun telescope, crosses the sky and creates an artificial star at 90 km altitude in the high Earth´s mesosphere. The LGS is part of the VLT´s Adaptive Optics system and it is used as reference to correct images from the blurring effect of the atmosphere. Three of the four VLT 8.2-metre telescopes are seen in this impressive view. The Milky Way, with the bright star Sirius at the centre, appears almost perpendicular to the direction of the laser. On the left edge, the sword of the Orion constellation is visible; the brightest diffuse spot is the star formation region M42, better known as the Orion Nebula.

Credit: G. Hüdepohl (atacamaphoto.com)/ESO

Paranal After Sunset

The four Unit Telescopes of ESO's Very Large Telescope (VLT) on top of Cerro Paranal, illuminated by starlight on a dark and very clear night, typical of this excellent site, among the best in the world for astronomical observations.

Credit: ESO/Y. Beletsky

The Eagle's EGGs

Messier 16 (M16), also known as the Eagle Nebula, is located in the southern constellation of Serpens (the Snake).

Using the infrared multi-mode ISAAC instrument on the 8.2-metre VLT ANTU telescope, European astronomers were able to image the Eagle Nebula at near-infrared wavelength. The ISAAC near-infrared images cover a 9 x 9 arcminutes region, in three broad-band colours and with sufficient sensitivity to detect young stars of all masses and — most importantly — with an image sharpness as good as 0.35 arcseconds.

The wide-field view of M16 shows that there is much happening in the region. The first impression one gets is of an enormous number of stars. Those which are blue in the infrared image are either members of the young NGC 6611 cluster — whose massive stars are concentrated in the upper right (north west) part of the field — or foreground stars which happen to lie along the line of sight towards M16.

Most of the stars are fainter and more yellow. They are ordinary stars behind M16, along the line of sight through the galactic bulge, and are seen through the molecular clouds out of which NGC 6611 formed. Some very red stars are also seen: these are either very young and embedded in gas and dust clouds, or just brighter stars in the background shining through them.

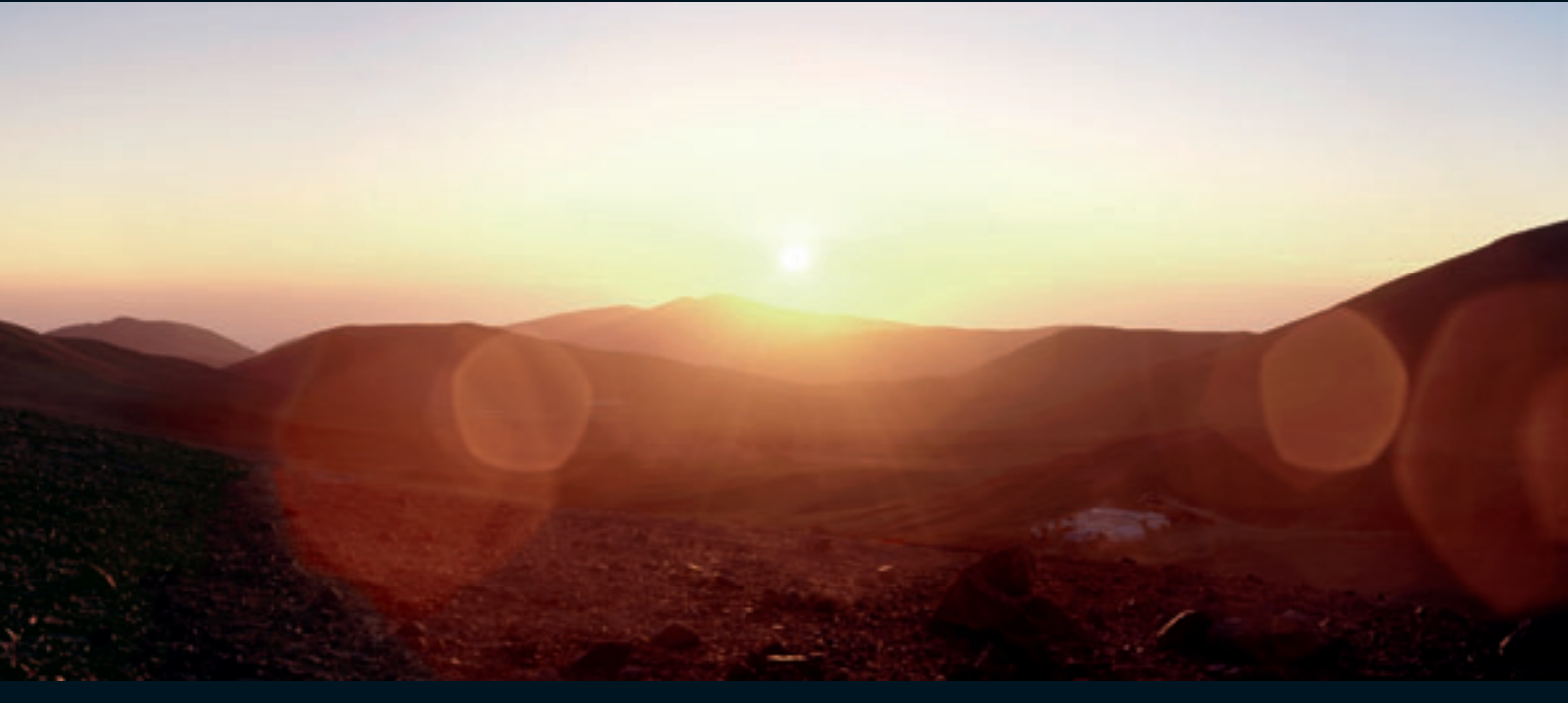
This photo is the result of a three-colour composite mosaic image of the Eagle Nebula (Messier 16), based on 144 individual images obtained with the infrared multi-mode instrument ISAAC on the ESO Very Large Telescope (VLT) at the Paranal Observatory. At the centre, the so-called "Pillars of Creation" can be seen. This wide-field infrared image shows not only the central three pillars but also several others in the same star-forming region, as well as a huge number of stars in front of, in, or behind the Eagle Nebula. The cluster of bright blue stars to the upper right is NGC 6611, home to the massive and hot stars that illuminate the pillars.

Credit: ESO/M. McCaughrean & M. Andersen (AIP)

Panoramic View of the Paranal Area

Panoramic sunset view of the ESO Paranal Observatory — home of the world's largest optical/infrared telescope, the Very Large Telescope (VLT).

Credit: ESO/H.H.Heyer



VISTA's look at the Helix Nebula

ESO's Visible and Infrared Survey Telescope for Astronomy (VISTA) has captured this unusual view of the Helix Nebula (NGC 7293), a planetary nebula located 700 light-years away. The coloured picture was created from images taken through Y, J and K infrared filters. While bringing to light a rich background of stars and galaxies, the telescope's infrared vision also reveals strands of cold nebular gas that are mostly obscured in visible images of the Helix.

Credit: ESO/VISTA/J. Emerson.
Acknowledgment: Cambridge Astronomical Survey Unit

The Cool Clouds of Carina

Observations made with the APEX telescope in submillimetre-wavelength light at a wavelength of 870 µm reveal the cold dusty clouds from which stars form in the Carina Nebula. This site of violent star formation, which plays host to some of the highest-mass stars in our galaxy, is an ideal arena in which to study the interactions between these young stars and their parent molecular clouds.

The APEX observations, made with its LABOCA camera, are shown here in orange tones, combined with a visible light image from the Curtis Schmidt telescope at the Cerro Tololo Interamerican Observatory. The result is a dramatic, wide-field picture that provides a spectacular view of Carina's star formation sites. The nebula contains stars equivalent to over 25 000 Suns, and the total mass of gas and dust clouds is that of about 140 000 Suns.

Credit: ESO/APEX/T. Preibisch et al. (Submillimetre); N. Smith, University of Minnesota/NOAO/AURA/NSF (Optical)

Laser Meets Lightning

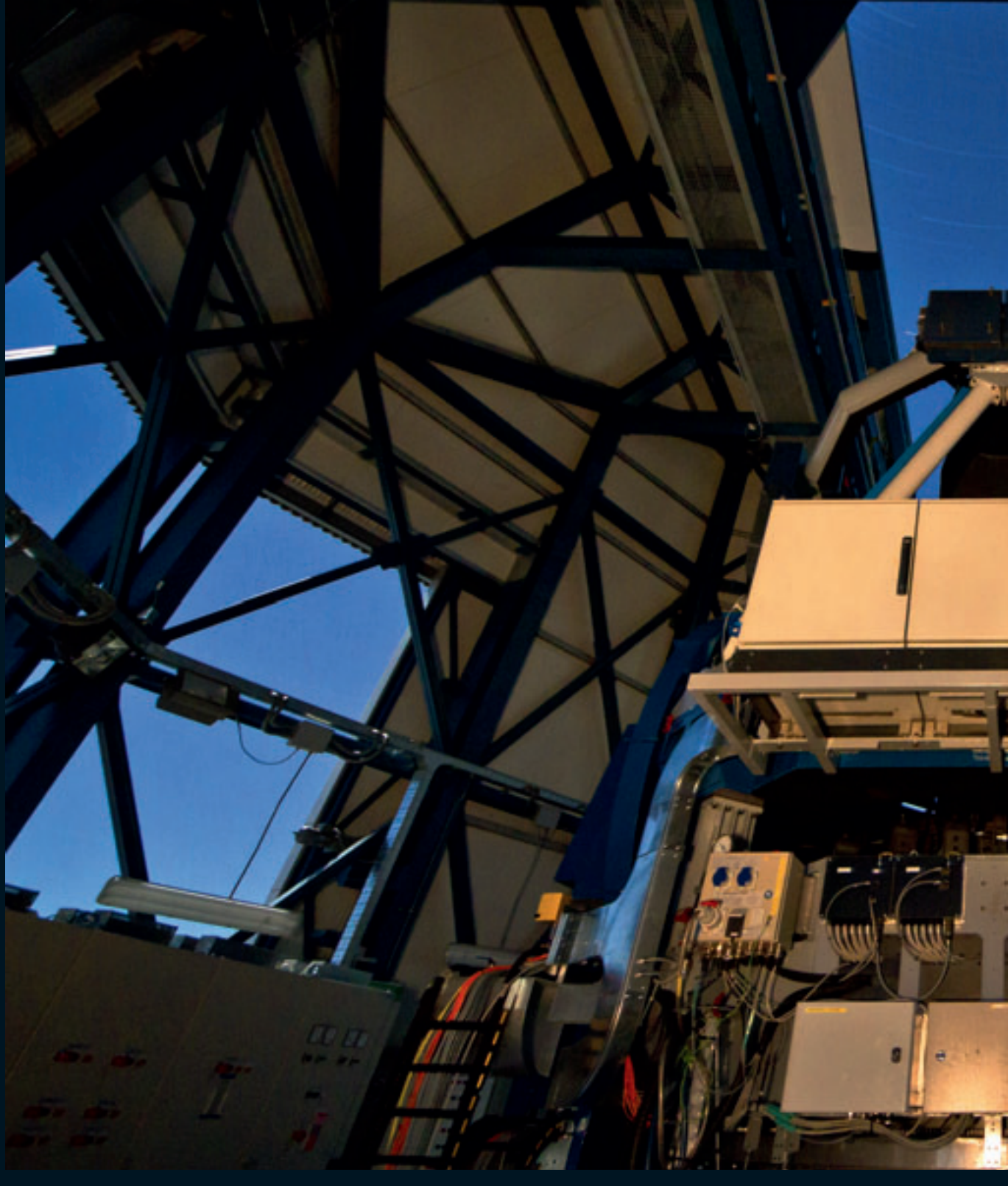
On Thursday 18 August, the sky above the Allgäu Public Observatory in southwestern Bavaria was an amazing sight, with the night lit up by two very different phenomena: one an example of advanced technology, and the other of nature's dramatic power.

As ESO tested the new Wendelstein laser guide star unit by shooting a powerful laser beam into the atmosphere, one of the region's intense summer thunderstorms was approaching — a very visual demonstration of why ESO's telescopes are in Chile, and not in Germany. Heavy grey clouds threw down bolts of lightning as Martin Kornmesser, visual artist for the ESO outreach department, took timelapse photographs of the test for ESOcast 34. With purely coincidental timing this photograph was snapped just as lightning flashed, resulting in a breathtaking image that looks like a scene from a science fiction movie. Although the storm was still far from the observatory, the lightning appears to clash with the laser beam in the sky.

Laser guide stars are artificial stars created 90 kilometres up in the Earth's atmosphere using a laser beam. Measurements of this artificial star can be used to correct for the blurring effect of the atmosphere in astronomical observations — a technique known as adaptive optics. The Wendelstein laser guide star unit is a new design, combining the laser with the small telescope used to launch it in a single modular unit, which can then be placed onto larger telescopes.

The laser in this photograph is a powerful one, with a 20-watt beam, but the power in a bolt of lightning peaks at a trillion (one million million) watts, albeit for just a fraction of a second! Shortly after this picture was taken the storm reached the observatory, forcing operations to close for the night. While we may have the ability to harness advanced technology for devices such as laser guide stars, we are still subject to the forces of nature, not least among them the weather!

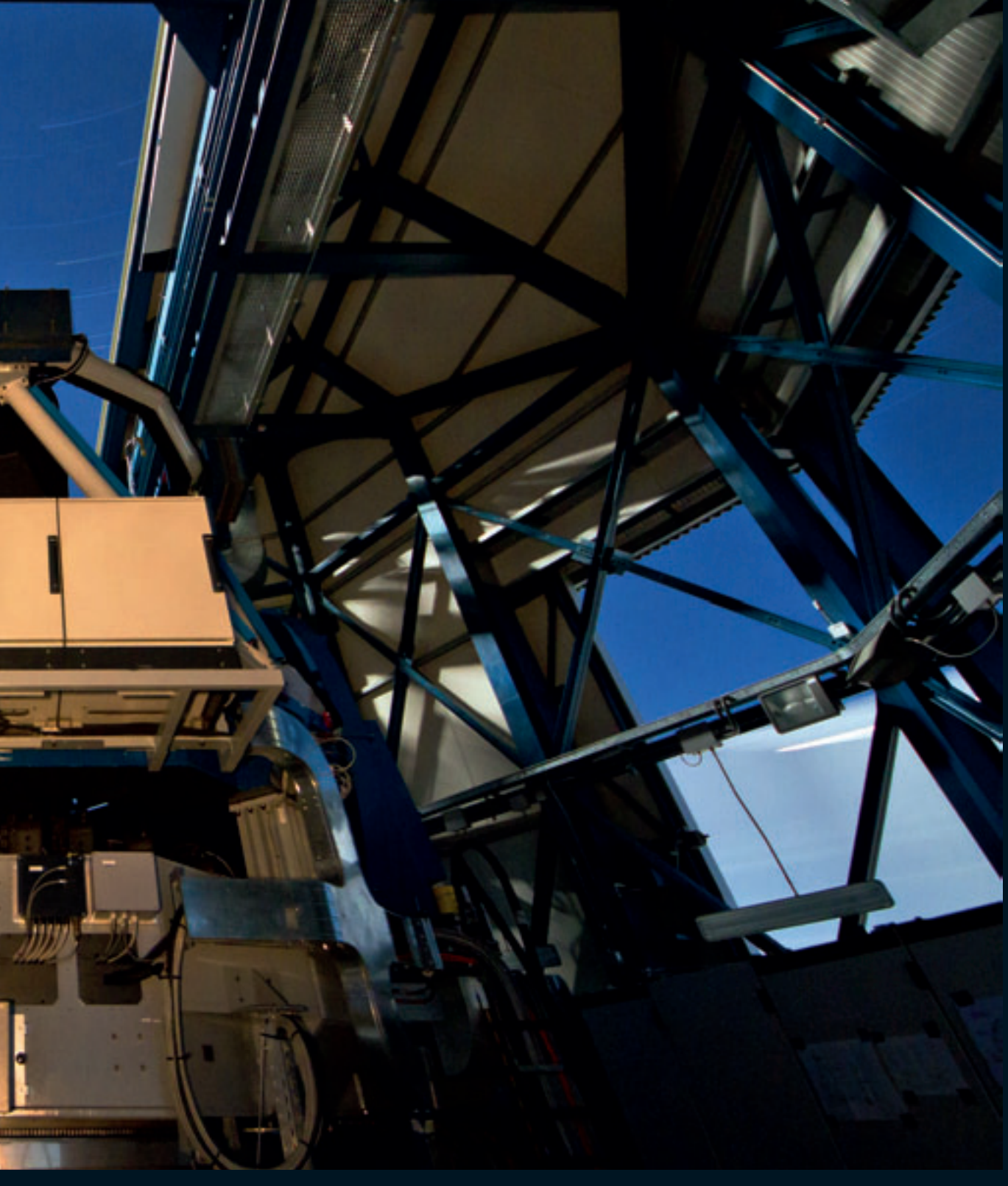
Credit: ESO/M. Kornmesser



The VLT Survey Telescope (VST)

The VLT Survey Telescope (VST) at Cerro Paranal. The VST is a state-of-the-art 2.6-metre telescope equipped with OmegaCAM, a monster 268 megapixel CCD camera with a field of view four times the area of the full Moon. It will survey the visible-light sky. The VST is the result of a joint venture between ESO and the Capodimonte Astronomical Observatory (OAC) of Naples, a research centre of the Italian National Institute for Astrophysics (INAF).

Credit: ESO/G. Lombardi



Another Perfect Day at Paranal

Rolling red hills stretch out below the exceptionally clear blue sky that is typical of ESO's Paranal Observatory. Although the telescope domes close at dawn, and nothing seems to move on the surface of this barren desert, the ESO Very Large Telescope (VLT) never rests. Since early morning, a team of engineers and technicians has been working hard to prepare the telescopes and instruments for another "perfect night".

The 2600-metre-high Cerro Paranal stands out at the centre of this panoramic view, taken looking towards the south. This flattened mountaintop is home to the VLT, the world's most advanced ground-based optical and near infrared astronomical facility. The VLT has four 8.2-metre Unit Telescopes (UTs), plus four 1.8-metre Auxiliary Telescopes (ATs). In this picture, only two of the UT enclosures, together with the smaller 2.6-metre VLT Survey Telescope (VST) are visible.

To the right of Cerro Paranal, the sea of clouds that typically covers the coast of the Pacific Ocean — only 12 km away — is visible in the background. The cold oceanic stream typically keeps the thermal inversion layer of the atmosphere below an altitude of 1500 metres, making this remote area of the Chilean Atacama Desert in the II Region of Chile one of the driest sites on Earth and a perfect window on the Universe. The atmosphere here is extremely dry and clear, and has very low turbulence, offering the most suitable conditions for optical and near-infrared astronomical observations.

For this reason, the 3060-metre-high Cerro Armazones, located just some 20 km east of Paranal, was selected as the site for the future European Extremely Large Telescope (E-ELT). With a primary mirror 39.3 metres in diameter, the E-ELT will be the world's largest eye on the sky.

This photograph was taken from a neighbouring mountain, home of the 4.1-metre Visible and Infrared Survey Telescope for Astronomy (VISTA). VISTA started operations at the end of 2009 and is the most recent telescope to be added to the roster at ESO's Paranal Observatory. VISTA is the largest survey telescope in the world.

Credit: ESO/José Francisco Salgado (josefrancisco.org)

The Galactic Centre above the ESO 3.6-metre Telescope

The ESO 3.6-metre telescope at La Silla, during observations, with the telescope's dome lit by the Moon. Across the sky is the plane of the Milky Way, our own galaxy, a disk-shaped structure seen edge-on. Above the telescope dome, and partially hidden behind dark interstellar dust clouds, is the prominent yellowish central bulge of the Milky Way. The plane of the galaxy is populated by hundreds of billions of stars, as well as interstellar gas and dust. The dust absorbs the visible light and re-emits it at longer wavelengths. Where it forms dense dust lanes, it appears dark and opaque to our eyes. The ancient Andean civilisations saw in these dark lanes their animal-shaped constellations. By following the dark lane which seems to grow from the centre of the Galaxy toward the top, we find the reddish nebula around Antares (Alpha Scorpii). The Galactic Centre itself lies in the constellation of Sagittarius and reaches its maximum visibility during the southern winter season. The ESO 3.6-metre telescope, inaugurated in 1976, currently operates with the HARPS spectrograph, the most precise exoplanet "hunter" in the world. Located 600 km north of Santiago, at 2400 metre altitude in the outskirts of the Chilean Atacama Desert, La Silla was the first ESO site in Chile and the largest observatory of its time.

Credit: S. Brunier/ESO

Starlight Shines Brightly Above Paranal

After the Sun sets at ESO's Paranal Observatory darkness descends, but the black sky is speckled with a glorious myriad of sparkling stars. This 15-second exposure demonstrates just how dazzling the skies above Paranal are. Located high in the Atacama Desert in Chile far from any sources of light pollution, on a clear moonless night it is possible to see your shadow cast by the light of the Milky Way alone.

Says visual artist and ESO Photo Ambassador José Francisco Salgado, *"The skies at Paranal are among the darkest and steadiest I have photographed. I love photographing observatories and at Paranal it's incredible how you can still see just with starlight and zodiacal light!"*

In the image the stars of the Milky Way seem to be pouring forth from the open dome of the telescope. The brightest patch close to the telescope is the Carina Nebula (NGC 3372), which contains some of the most massive stars in our galaxy (see for example eso0905 and eso1031). Near the top of the image are the stars of Crux, the Southern Cross. This constellation, and that of Carina, are in the southern sky and are therefore not visible from most northern latitudes.

The telescope in the image is the fourth 1.8-metre Auxiliary Telescope, part of the Very Large Telescope Interferometer (VLTI). The VLTI consists of four 8.2-metre telescopes, and the four smaller Auxiliary Telescopes, which have mirrors 1.8 metres across. Thanks to the size of the telescopes, their cutting-edge technology, and the excellent conditions at the site, it is no wonder that Paranal is considered the most advanced visible-light observatory in the world.

Credit: ESO/José Francisco Salgado (josefrancisco.org)


4

Wide Field Imager view of the southern spiral NGC 300

This picture of the spectacular southern spiral galaxy NGC 300 was taken using the Wide Field Imager (WFI) at ESO's La Silla Observatory in Chile. It was assembled from many individual images through a large set of different filters over many observing nights, spanning several years. The main purpose of this extensive observational campaign was to get an unusually thorough census of the stars in the galaxy, counting both the number and varieties of stars and marking regions, or even individual stars, that warrant deeper and more focussed investigation. But such a rich data collection will also have many other uses for years to come.

The images were mostly taken through filters that transmit red, green or blue light. These were supplemented by images through special filters that allow through only the light from ionised hydrogen or oxygen gas and highlight the glowing clouds in the galaxy's spiral arms. The total exposure time amounted to around 50 hours.

Credit: ESO

A European ALMA antenna takes a ride on a transporter

A European Atacama Large Millimeter/ submillimeter Array (ALMA) antenna takes a ride on Lore, one of the ALMA Transporters, at the 2900-metre altitude Operations Support Facility in the Chilean Andes. This took place on 23 June 2010, and was the first time that European antennas have been lifted with the transporters, a procedure that was fully successful, with both moves completed in a single day.

The first two European antennas for ALMA have been moved to two new outdoor foundation pads in order to perform tests of their dish surface accuracy. In this process, known as holography, the antennas observe the signals from a special transmitter located on a nearby tower. In order to allow parallel assembly of several antennas, two new foundations have recently been built. As the newly built foundations lie between the original positions of the two antennas and the holography tower, the antennas were moved to the new locations.

The European ALMA antennas are provided by ESO, through a contract with the AEM Consortium (Thales Alenia Space, European Industrial Engineering, and MT-Aerospace). The ALMA antenna transporters are also provided by ESO, and manufactured by the company Scheuerle Fahrzeugfabrik GmbH. ALMA, an international astronomy facility, is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile.

Credit: ALMA (ESO/NAOJ/NRAO)


SCHEUERLE

The VLT´s Laser Guide Star

A laser beam launched from VLT´s 8.2-metre Yepun telescope crosses the majestic southern sky and creates an artificial star at 90 km altitude in the high Earth´s mesosphere. The Laser Guide Star (LGS) is part of the VLT´s Adaptive Optics system and it is used as reference to correct images from the blurring effect of the atmosphere. The picture field is crossed by an impressive Milky Way, our own galaxy seen perfectly edge-on. The most prominent objects on the Milky Way are: Sirius, the brightest star in the sky, visible at the top and the Carina nebula, seen as a bright patch besides the telescope. From the right edge of the picture to the left, the following objects are aligned: the Small Magellanic Cloud (with the globular cluster 47 Tucanae on its right), the Large Magellanic Cloud and Canopus, the second brightest star in the sky.

Credit: G. Hüdepohl (atacamaphoto.com)

The Cat’s Paw Nebula

The Cat’s Paw Nebula (NGC 6334) is a vast region of star formation. This new portrait of NGC 6334 was created from images taken with the Wide Field Imager instrument at the 2.2-metre MPG/ESO telescope at the La Silla Observatory in Chile, combining images taken through blue, green and red filters, as well as a special filter designed to let through the light of glowing hydrogen. NGC 6334 lies about 5500 light-years from Earth in the constellation of Scorpius. The whole gas cloud is about 50 light-years across.

NGC 6334 is one of the most active nurseries of massive stars in our galaxy and has been extensively studied by astronomers. The nebula conceals freshly minted brilliant blue stars — each nearly ten times the mass of our Sun and born in the last few million years. The region is also home to many baby stars that are buried deep in the dust, making them difficult to study. In total, the Cat’s Paw Nebula could contain several tens of thousands of stars.

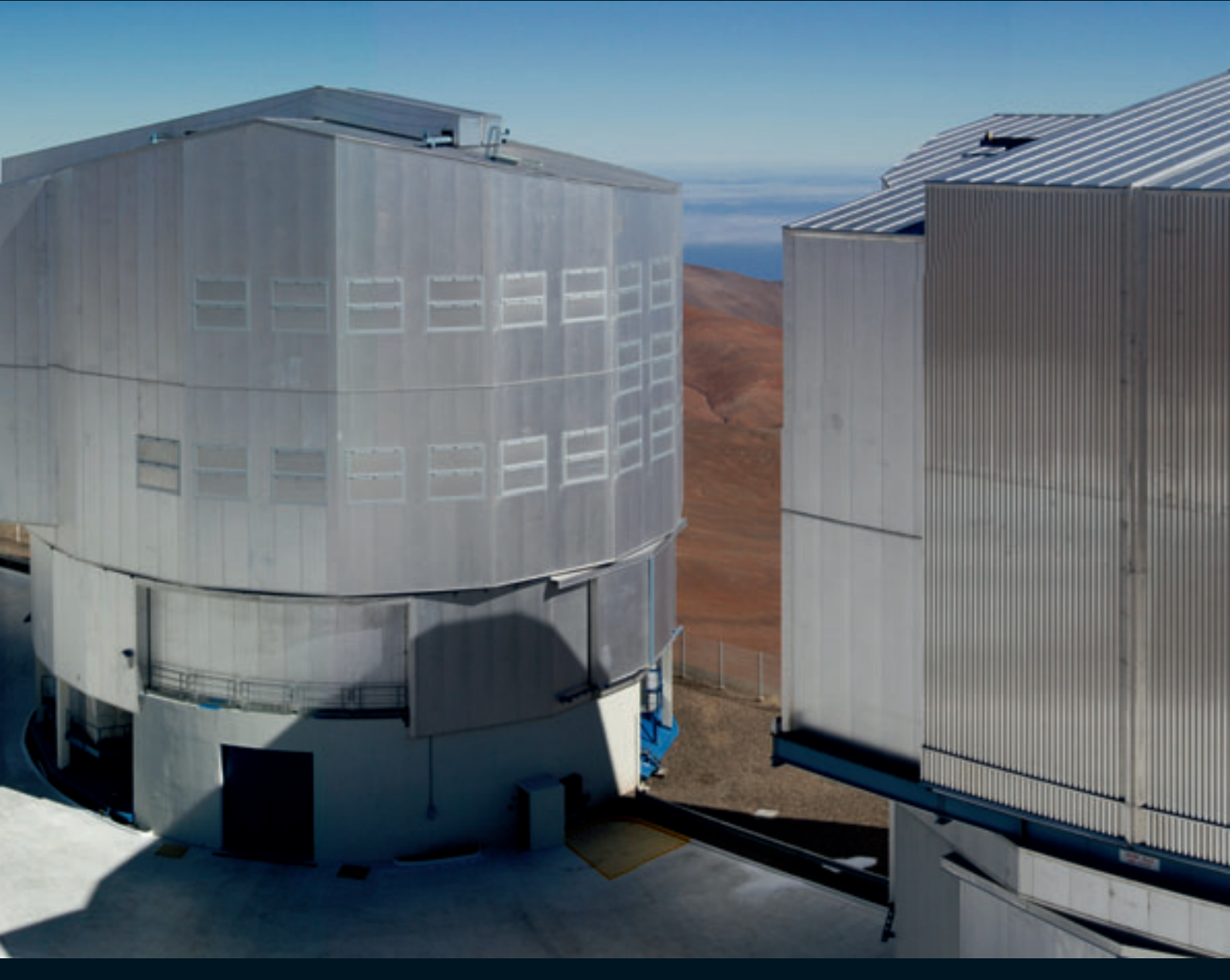
The nebula appears red because its blue and green light are scattered and absorbed more efficiently by material between the nebula and Earth. The red light comes predominantly from hydrogen gas glowing under the intense glare of hot young stars.

Credit: ESO

The VLT platform on top of Cerro Paranal

This image shows the platform on the summit of Cerro Paranal, in Northern Chile that houses the ESO Very Large Telescope (VLT). Three of the enclosures protecting the 8.2-metre diameter VLT Unit Telescopes (UTs) are shown and the photographer was on the top of the fourth one, about 35 metres above the platform. At night the huge doors in the enclosures slide open and the 275-tonne top parts of these buildings rotate so that the telescope can observe any part of the sky. The pick-up truck in front of the first UT helps give the scale of this 10-story high building. On the left of the image the rails on which the 1.8-metre Auxiliary Telescopes (ATs) can be moved to different observing stations are visible. Two of the four ATs are visible in the picture. The low building in the lower left corner houses the VLT Interferometer laboratory, where the light from several telescopes can be combined, a technique that reveals details much smaller than can be seen with a single telescope. Behind the telescopes the desert hills surrounding Cerro Paranal stretch into the distance. Further away the cloud-covered Pacific Ocean can be seen: only 12 km away but 2.6 km lower down.

Credit: ESO/G.Hüdepohl (atacamaphoto.com)



VLT and VISTA in Early Sunlight

This early morning shot shows the Visible and Infrared Survey Telescope for Astronomy (VISTA) in front of the Paranal summit. VISTA is a wide-field telescope that will perform a series of very broad surveys of the sky in infrared light. Thanks to its fairly large primary mirror, with a diameter of four metre, these surveys will show quite faint objects. The goal of these surveys is to create large catalogues of celestial objects for statistical studies and to identify new targets for the VLT. This picture was obtained in November 2007 during sunrise.

Credit: ESO/H.H.Heyer

Creating a Star

A laser beam shoots out of Yepun, the fourth Unit Telescope of Europe's flagship observatory, ESO's Very Large Telescope (VLT). This beam is used to create an artificial star above Paranal to assist the adaptive optics instruments on the VLT. Adaptive optics is a technique that allows astronomers to overcome the blurring effect of the atmosphere and obtain images almost as sharp as would be possible if the whole telescope were placed in space, above Earth's atmosphere. Adaptive optics, however, requires a nearby reference star that has to be relatively bright, thereby limiting the area of the sky that can be surveyed. To overcome this difficulty, astronomers at Paranal use a powerful laser that creates an artificial star where and when they need it (see eso0607 and eso0727). Launching such a powerful laser from a telescope is a state-of-the-art technology, whose set-up and operation is a continuous challenge. As seen from the image, this is, however, a technology now well mastered on Paranal. The image was taken from inside the dome of the telescope and reveals nicely how the laser is located on top of the 1.2-metre secondary mirror of the telescope.

Credit: ESO/Y. Beletsky

Paranal Starry Night

Night scene at the 2600 metre high Cerro Paranal, home of ESO's Very Large Telescope (VLT) array.

In this 45-minute exposure, taken on a dark and clear night so typical of one of the best astronomical observing sites in the world, the stars leave trails in their dance around the Celestial South Pole (left).

The four VLT 8.2-metre Unit Telescopes are captured during an observation session, with the long exposure resulting in noticeable movement of the domes as the telescopes move to observe different celestial objects.

At the bottom left, the trail left by the Large Magellanic Cloud, one of the Milky Way's satellite galaxies, is clearly visible. The trails left by the Milky Way and by the very bright stars forming the Southern Cross, are visible above Yepun, Unit Telescope 4, in the foreground. One of the four 1.8-metre Auxiliary Telescopes, used for the Very Large Telescope Interferometer, is seen below the Large Magellanic Cloud, dwarfed by its giant Unit Telescope companions.

The image was taken in March 2008.

Credit: Gianluca Lombardi/ESO

The White Penitents

These bizarre snow and ice formations, called “penitentes, form in high-altitude regions such as the Chajnantor plain, close to where the ALMA array will be located.

These are ice blades produced by the competition between sublimation and melting of the snow. At Chajnantor at the summer solstice, the Sun is close to the zenith at noon, and penitents are vertical. This image was taken in December 2005.

Credit: ESO

Paranal at Sunrise II

At dawn the telescope enclosures of the VLT close for the day.

Credit: ESO/H.H.Heyer

A plume on Betelgeuse (artist’s impression)

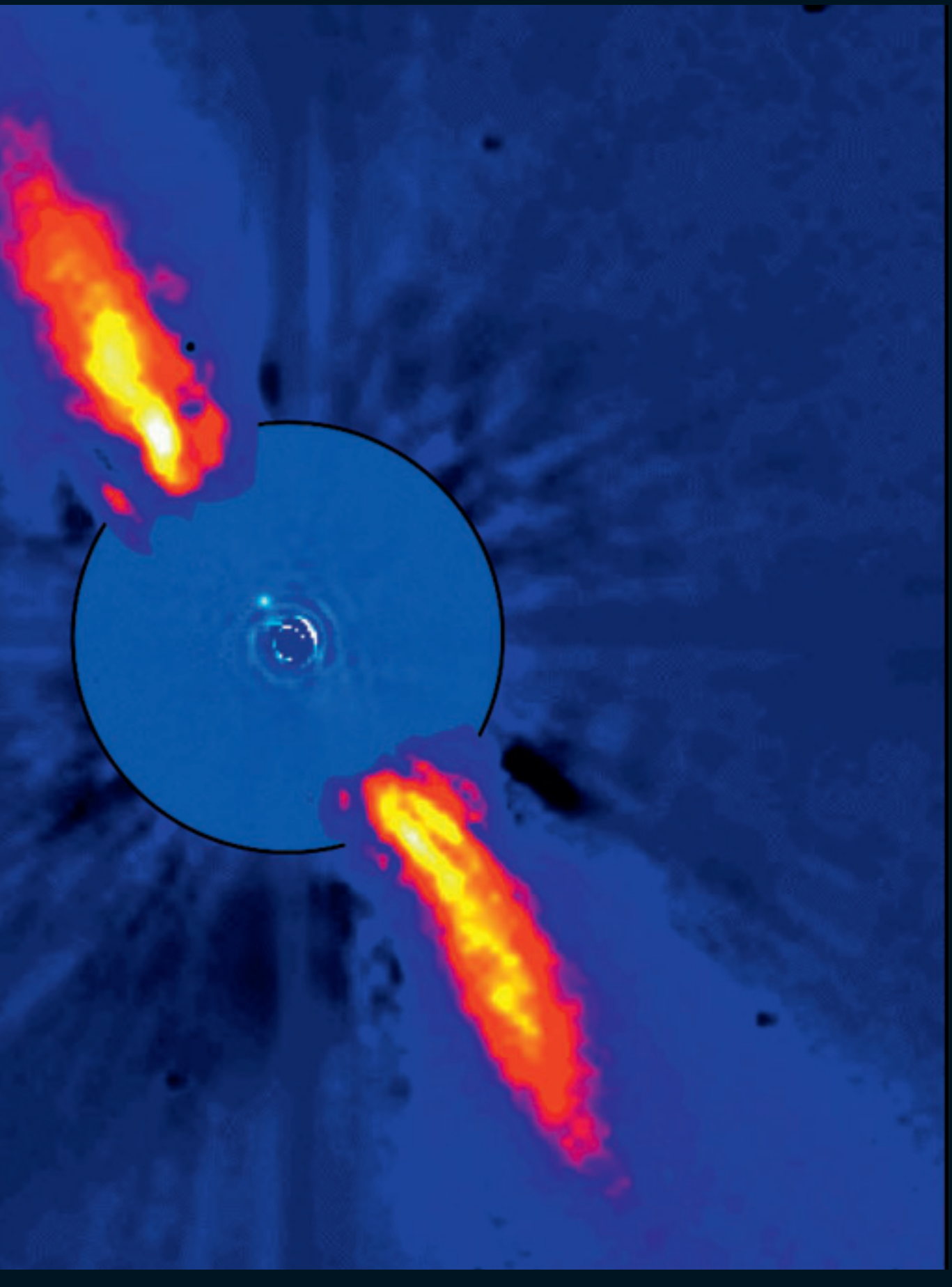
This artist’s impression shows the supergiant star Betelgeuse as it was revealed thanks to different state-of-the-art techniques on ESO’s Very Large Telescope (VLT), which allowed two independent teams of astronomers to obtain the sharpest ever views of the supergiant star Betelgeuse. They show that the star has a vast plume of gas almost as large as our Solar System and a gigantic bubble boiling on its surface. These discoveries provide important clues to help explain how these mammoths shed material at such a tremendous rate.

Credit: ESO/L. Calçada

Beta Pictoris as Seen in Infrared Light

This composite image represents the close environment of Beta Pictoris as seen in near infrared light. This very faint environment is revealed after a very careful subtraction of the much brighter stellar halo. The outer part of the image shows the reflected light on the dust disc, as observed in 1996 with the ADONIS instrument on ESO's 3.6-metre telescope; the inner part is the innermost part of the system, as seen at 3.6 microns with NACO on the Very Large Telescope. The newly detected source is more than 1000 times fainter than Beta Pictoris, aligned with the disc, at a projected distance of 8 times the Earth-Sun distance. This corresponds to 0.44 arcsecond on the sky, or the angle sustained by a one Euro coin seen at a distance of about 10 kilometres. Because the planet is still very young, it is still very hot, with a temperature around 1200 degrees Celsius. Both parts of the image were obtained on ESO telescopes equipped with adaptive optics.

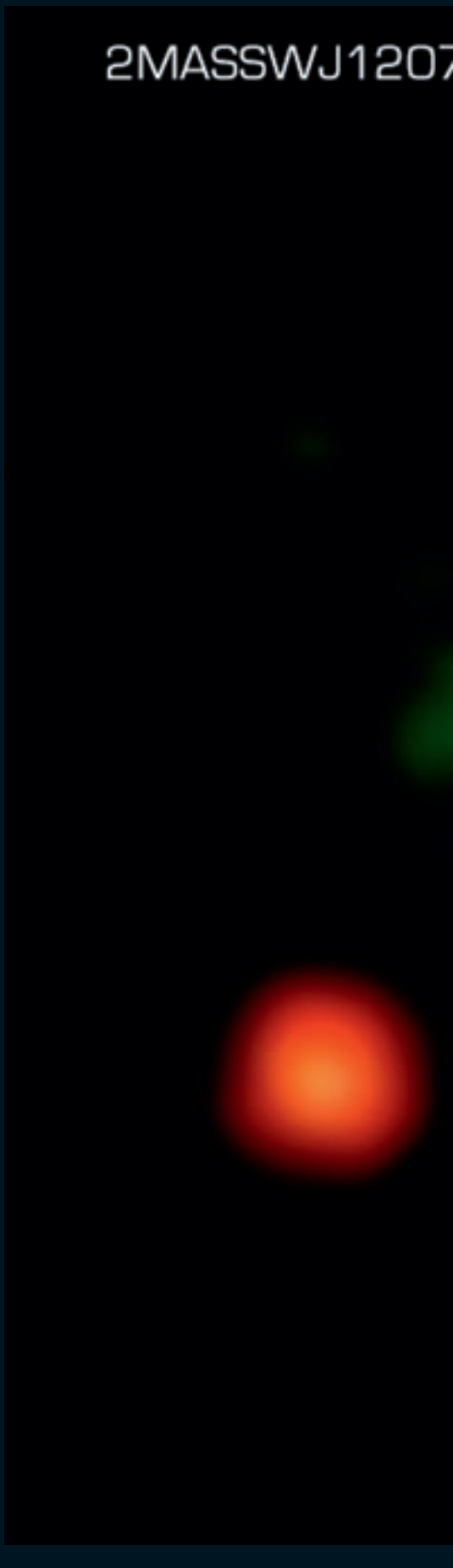
Credit: ESO/A.-M. Lagrange et al.

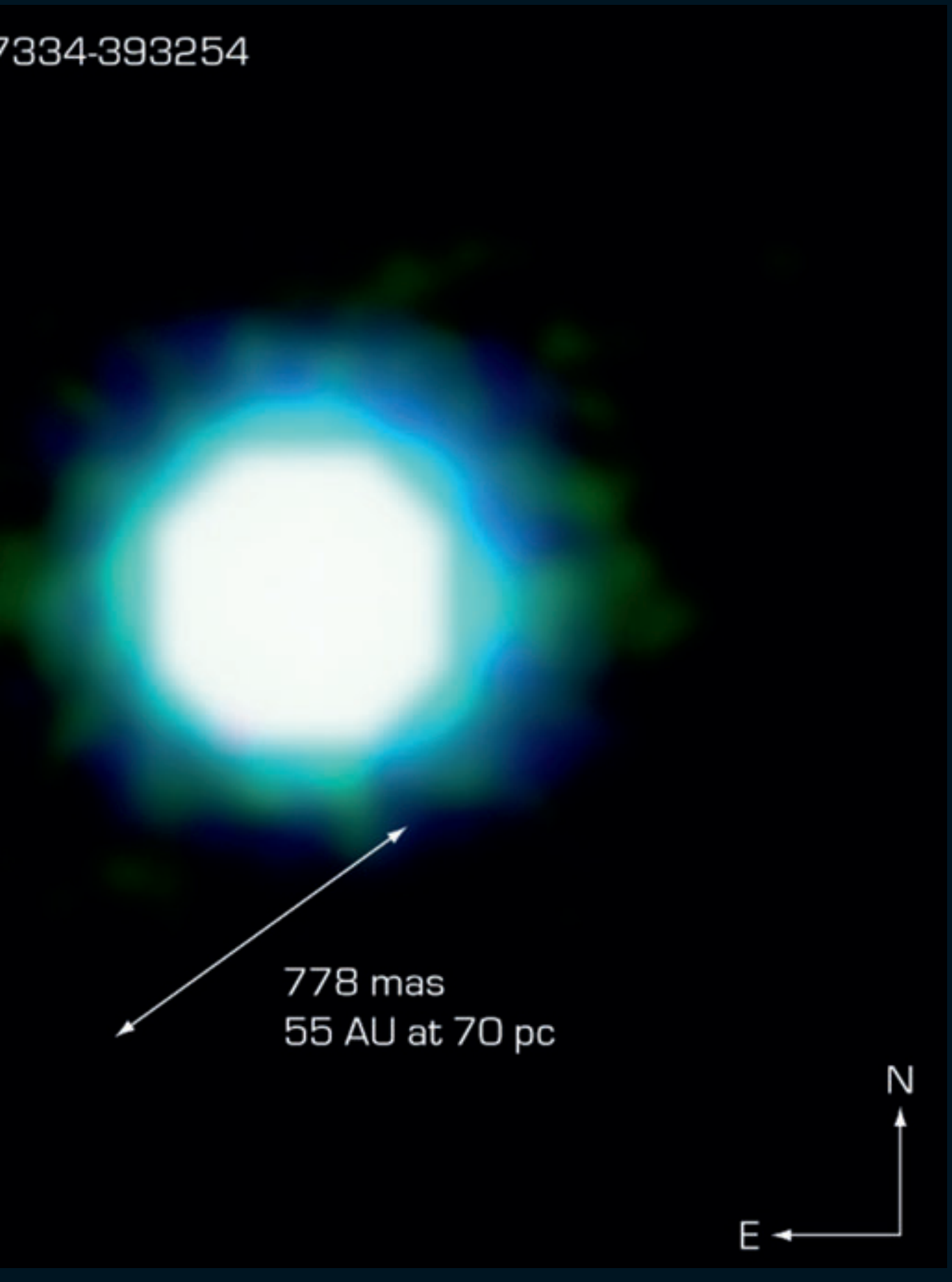


The Brown Dwarf Object 2M1207 and GPCC

This is a composite image of the brown dwarf object 2M1207 (centre) and the fainter object seen near it, at an angular distance of 778 milliarcsec. Designated “Giant Planet Candidate Companion” by the discoverers, it may represent the first image of an exoplanet. Further observations, in particular of its motion in the sky relative to 2M1207 are needed to ascertain its true nature. The photo is based on three near-infrared exposures (in the H, K and L’ wavebands) with the NACO adaptive-optics facility at the 8.2-metre VLT Yepun telescope at the ESO Paranal Observatory.

Credit: ESO

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Fine Shades of a Sombrero

Image of the famous early-type spiral galaxy Messier 104, widely known as the “Sombrero” (the Mexican hat) because of its particular shape. The “Sombrero” is located in the constellation Virgo (The Virgin), at a distance of about 50 million light-years.

Messier 104 is the 104th object in the famous catalogue of nebulae by French astronomer Charles Messier (1730–1817). It was not included in the first two editions (with 45 objects in 1774; 103 in 1781), but Messier soon thereafter added it by hand in his personal copy as a “very faint nebula”. The recession velocity, about 1000 km/sec, was first measured by American astronomer Vesto M. Slipher at the Lowell Observatory in 1912; he was also the first to detect the galaxy’s rotation.

This galaxy is notable for its dominant nuclear bulge, composed primarily of mature stars, and its nearly edge-on disc composed of stars, gas, and intricately structured dust. The complexity of this dust, and the high resolution of this image, is most apparent directly in front of the bright nucleus, but is also very evident as dark absorbing lanes throughout the disc. A significant fraction of the galaxy disc is even visible on the far side of the source, despite its massive bulge.

A large number of small and slightly diffuse sources can be seen as a swarm in the halo of Messier 104. Most of these are globular clusters, similar to those found in our own Galaxy

This picture was obtained with FORS1 multi-mode instrument at VLT ANTU on January 30, 2000. It is a composite of three exposures in different wavebands. North is up and East is left.

Technical information: This composite image is based on three exposures from the FORS1 instrument at VLT ANTU. They were obtained at about 6:20 hrs UT on January 30, 2000, through V-band (central wavelength 554 nm; 112 nm Full Width Half Maximum (FWHM); exposure time 120 sec; here rendered as blue), R-band (657 nm; 150 nm FWHM; 120 sec; green) and I-band (768 nm; 138 nm FWHM, 240 sec; red). The seeing was 0.6–0.7 arcseconds.

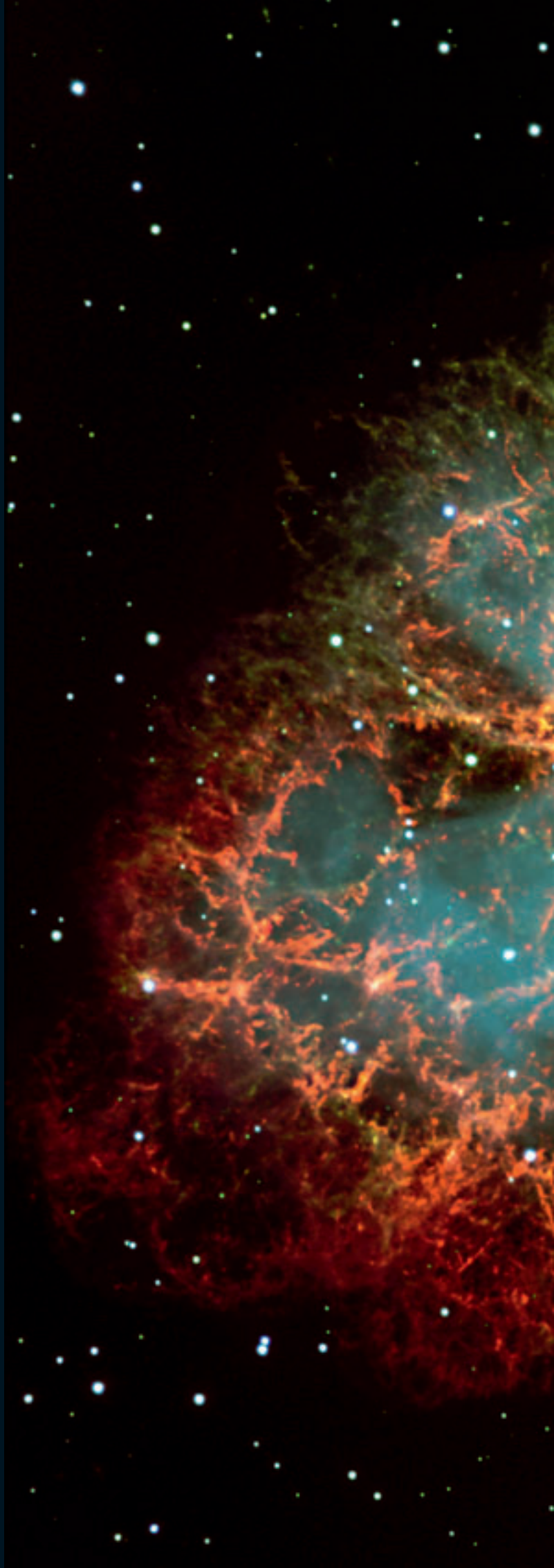
Credit: ESO/P. Barthel
Acknowledgments: Mark Neeser (Kapteyn Institute, Groningen) and Richard Hook (ST-ECF, Garching, Germany).

The Crab Nebula in Taurus

This photo shows a three colour composite of the well-known Crab Nebula (also known as Messier 1), as observed with the FORS2 instrument in imaging mode in the morning of November 10, 1999. It is the remnant of a supernova explosion at a distance of about 6000 light-years, observed almost 1000 years ago, in the year 1054. It contains a neutron star near its center that spins 30 times per second around its axis (see below).

In this picture, the green light is predominantly produced by hydrogen emission from material ejected by the star that exploded. The blue light is predominantly emitted by very high-energy ("relativistic") electrons that spiral in a large-scale magnetic field (so-called synchrotron emission). It is believed that these electrons are continuously accelerated and ejected by the rapidly spinning neutron star at the centre of the nebula and which is the remnant core of the exploded star. This pulsar has been identified with the lower/right of the two close stars near the geometric center of the nebula, immediately left of the small arc-like feature, best seen in ESO Press Photo eso9948. Technical information: ESO Press Photo eso9948 is based on a composite of three images taken through three different optical filters: B (429 nm; FWHM 88 nm; 5 min; here rendered as blue), R (657 nm; FWHM 150 nm; 1 min; green) and S II (673 nm; FWHM 6 nm; 5 min; red) during periods of 0.65 arcseconds (R, S II) and 0.80 (B) seeing, respectively. The field shown measures 6.8 x 6.8 arcminutes and the images were recorded in frames of 2048 x 2048 pixels, each measuring 0.2 arcseconds. North is up; East is left.

Credit: ESO



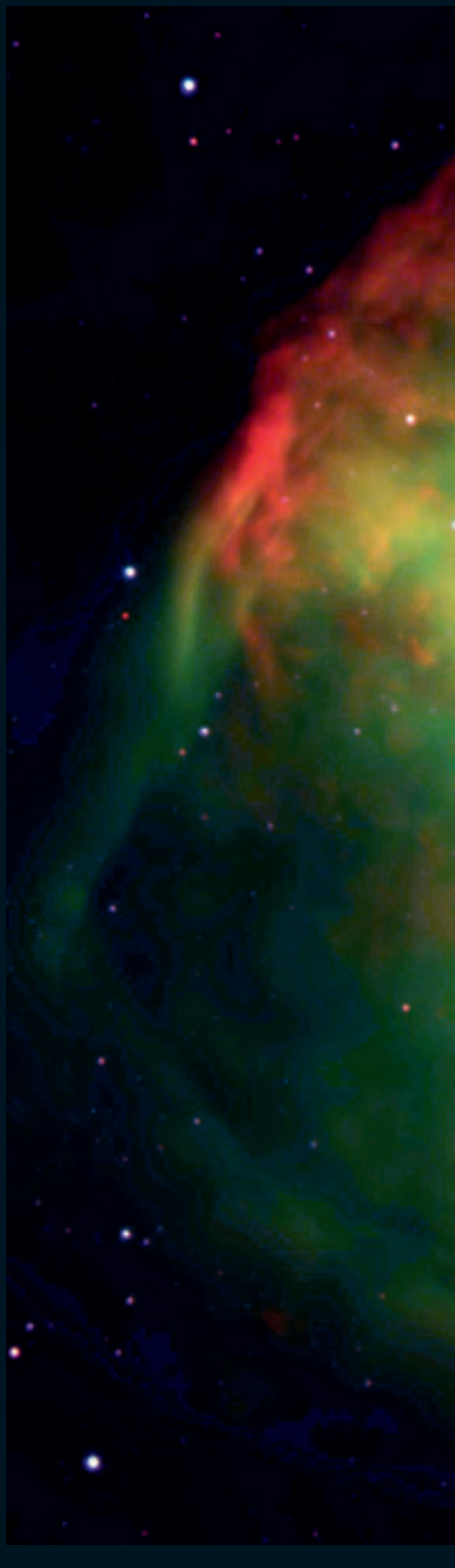
The Dumbbell Nebula

The Dumbbell Nebula — also known as Messier 27 or NGC 6853 — is a typical planetary nebula and is located in the constellation Vulpecula (The Fox). The distance is rather uncertain, but is believed to be around 1200 light-years. It was first described by the French astronomer and comet hunter Charles Messier who found it in 1764 and included it as no. 27 in his famous list of extended sky objects [2]. Despite its class, the Dumbbell Nebula has nothing to do with planets. It consists of very rarified gas that has been ejected from the hot central star (well visible on this photo), now in one of the last evolutionary stages. The gas atoms in the nebula are excited (heated) by the intense ultraviolet radiation from this star and emit strongly at specific wavelengths.

This image is the beautiful by-product of a technical test of some FORS1 narrow-band optical interference filtres. They only allow light in a small wavelength range to pass and are used to isolate emissions from particular atoms and ions. In this three-colour composite, a short exposure was first made through a wide-band filtre registering blue light from the nebula. It was then combined with exposures through two interference filtres in the light of double-ionized oxygen atoms and atomic hydrogen. They were colour-coded as “blue”, “green” and “red”, respectively, and then combined to produce this picture that shows the structure of the nebula in “approximately true” colours.

They are three-colour composite based on two interference ([O III] at 501 nm and 6 nm FWHM — 5 min exposure time; H-alpha at 656 nm and 6 nm FWHM — 5 min) and one broadband (Bessell B at 429 nm and 88 nm FWHM; 30 sec) filtre images, obtained on September 28, 1998, during mediocre seeing conditions (0.8 arcseconds). The CCD camera has 2048 x 2048 pixels, each covering 24 x 24 µm and the sky fields shown measure 6.8 x 6.8 arcminutes and 3.5 x 3.9 arcminutes, respectively. North is up; East is left.

Credit: ESO



Stars Trails over La Silla

A combined series of nighttime exposures captures these impressive star trails over ESO's La Silla observatory. The stars appear as trails because of the apparent daily motion of the sky, which is, in fact, due to the rotation of the Earth on its own axis. At the centre of the image, in the foreground, is the MPG/ESO 2.2-metre telescope, while in the background the NTT and the ESO 3.6-metre telescope are seen. On the right in the distance is the SEST. The picture is taken looking toward the east. The celestial south pole is not seen in the picture, but the direction is toward the upper right. The celestial equator is seen from the upper left corner, down to the ground. The trail of an aircraft is seen over the horizon.

Credit: ESO/J. Pérez

The star cluster NGC 2100 in the Large Magellanic Cloud

The brilliant star cluster NGC 2100 lies in the Large Magellanic Cloud, a small satellite galaxy of the Milky Way. This image was taken with the EMMI instrument on the ESO New Technology Telescope (NTT) at the La Silla Observatory in Chile. This star cluster lies close to the Tarantula Nebula and some of the colourful outer parts of the nebula appear in this image. The smaller cluster, close to the right-hand edge of the picture and just below centre, is NGC 2092.

Credit: ESO

A Laser Beam Towards the Milky Way's Centre

In mid-August 2010 ESO Photo Ambassador Yuri Beletsky snapped this amazing photo at ESO's Paranal Observatory. A group of astronomers were observing the centre of the Milky Way using the laser guide star facility at Yepun, one of the four Unit Telescopes of the Very Large Telescope (VLT).

Yepun's laser beam crosses the majestic southern sky and creates an artificial star at an altitude of 90 km high in the Earth's mesosphere. The Laser Guide Star (LGS) is part of the VLT's adaptive optics system and is used as a reference to correct the blurring effect of the atmosphere on images. The colour of the laser is precisely tuned to energise a layer of sodium atoms found in one of the upper layers of the atmosphere — one can recognise the familiar colour of sodium street lamps in the colour of the laser. This layer of sodium atoms is thought to be a leftover from meteorites entering the Earth's atmosphere. When excited by the light from the laser, the atoms start glowing, forming a small bright spot that can be used as an artificial reference star for the adaptive optics. Using this technique, astronomers can obtain sharper observations. For example, when looking towards the centre of our Milky Way, researchers can better monitor the galactic core, where a central supermassive black hole, surrounded by closely orbiting stars, is swallowing gas and dust.

The photo, which was chosen as Astronomy Picture of the Day for 6 September 2010 and Wikimedia Picture of the Year 2010, was taken with a wide-angle lens and covers about 180 degrees of the sky.

Credit: ESO/Y. Beletsky

The Orion Nebula

This new image of the Orion Nebula was captured using the Wide Field Imager camera on the MPG/ESO 2.2-metre telescope at the La Silla Observatory, Chile. This image is a composite of several exposures taken through a total of five different filters. Light that passed through a red filter, as well as light from a filter that shows the glowing hydrogen gas, is coloured red. Light in the yellow–green part of the spectrum is coloured green, blue light is coloured blue and light that passed through an ultraviolet filter has been coloured purple. The exposure times were about 52 minutes through each filter.

Credit: ESO/Igor Chekalin

Aerial View of the VLT Platform

Aerial view of the ESO Very Large Telescope (VLT), atop Cerro Paranal, in the Chilean Atacama Desert. On the low-left side of the platform, the buildings of the four giant 8.2-metre Unit Telescopes (UTs) are clearly distinguishable. The UTs can observe either individually or combined by two or three, using a technique called interferometry. Their position in the platform is the one which allows the maximum number of possible configurations. Aligned on the right of the UTs are the four 1.8-metre Auxiliary Telescopes (ATs), entirely dedicated to interferometric observations. The ATs can be relocated in 30 different observing positions, allowing a huge number of different configurations. On the left corner of the platform is the 2.6-metre VLT Survey Telescope (VST). With a 256 megapixels camera, the VST will have a field of view four times the area of the full Moon, enabling the VST to cover large areas of the sky. On the lower side of the platform is the Control Building, where astronomers operate the telescopes during the night.

Credit: J.L. Dauvergne & G. Hüdepohl/ESO

Dramatic Moonset — Amazing Sight on Cerro Paranal, Home of ESO's Very Large Telescope

As the full Moon sets, the Sun is about to rise on the opposite horizon. The Very Large Telescope has already closed its eyes after a long night of observations, and telescope operators and astronomers sleep while technicians, engineers and day astronomers wake up for a new day of work. Operations never stop at the most productive astronomical ground-based observatory in the world.

ESO staff member Gordon Gillet welcomed the new day by capturing this stunning image from 14 km away, on the road to the nearby Cerro Armazones, the peak recently chosen by the ESO Council as the preferred location for the planned 40-metre-class European Extremely Large Telescope (E-ELT).

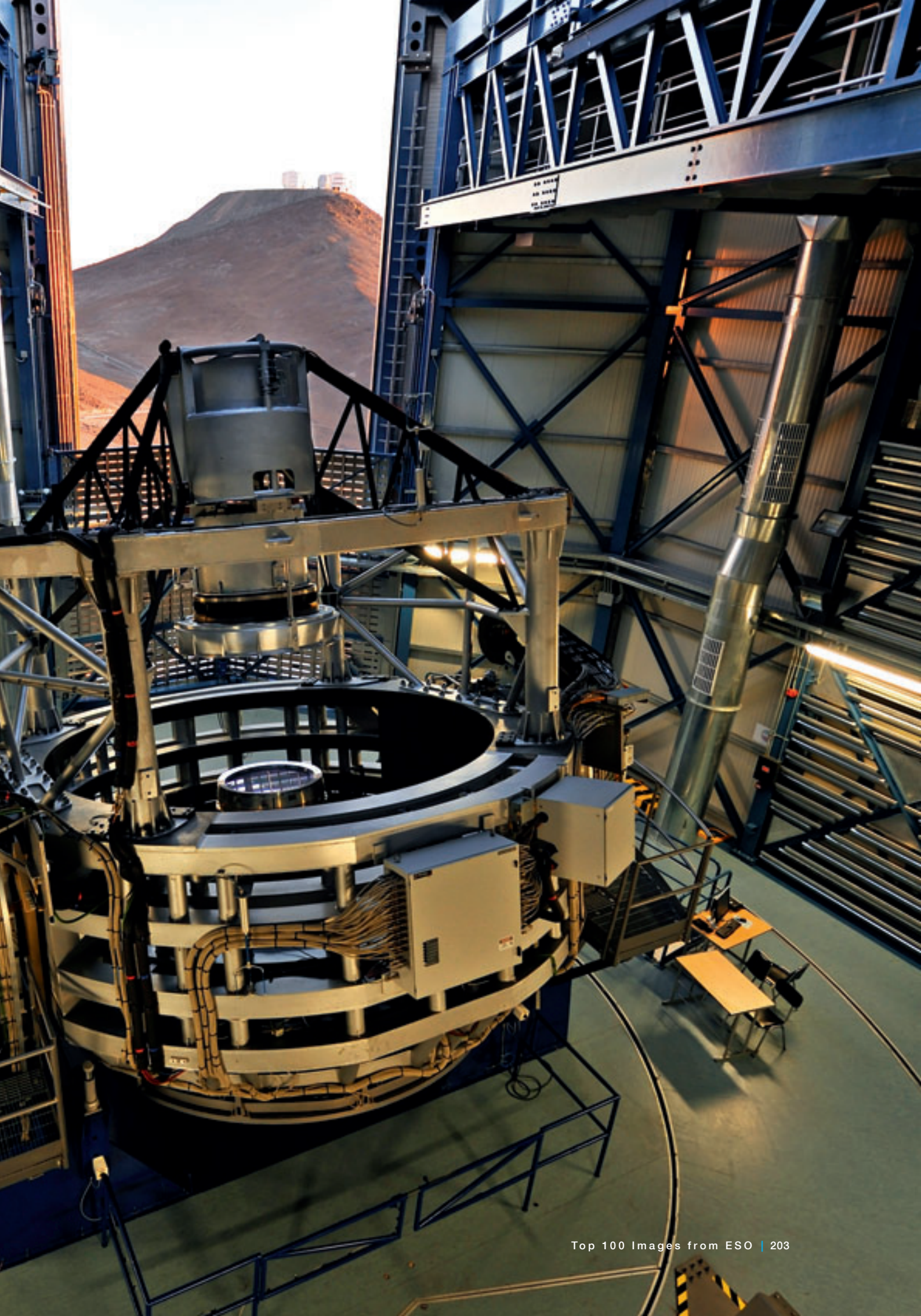
Contrary to what one may think, this picture is no montage. The Moon appears large because it is seen close to the horizon and our perception is deceived by the proximity of references on the ground. In order to get this spectacular close view, a 500-mm lens was necessary. The very long focal length reduces the depth of field making the objects in focus appear as if they were at the same distance. This effect, combined with the extraordinary quality of this picture, gives the impression that the Moon lies on the VLT platform, just behind the telescopes, even though it is in fact about 30 000 times further away.

Credit: G.Gillet/ESO

VISTA at sunset

This spectacular view of the VISTA telescope was taken from the roof of the building during the opening of the enclosure at sunset. The VLT is visible on the neighbouring mountain. VISTA is the largest survey telescope in the world and it is dedicated to mapping the sky at near-infrared wavelengths. Its primary mirror is 4.1 metres in diameter and is the most highly curved of its size. The extremely high curvature reduces the focal length, making the structure of the telescope extremely compact. VISTA can map large areas of the sky quickly and deeply.

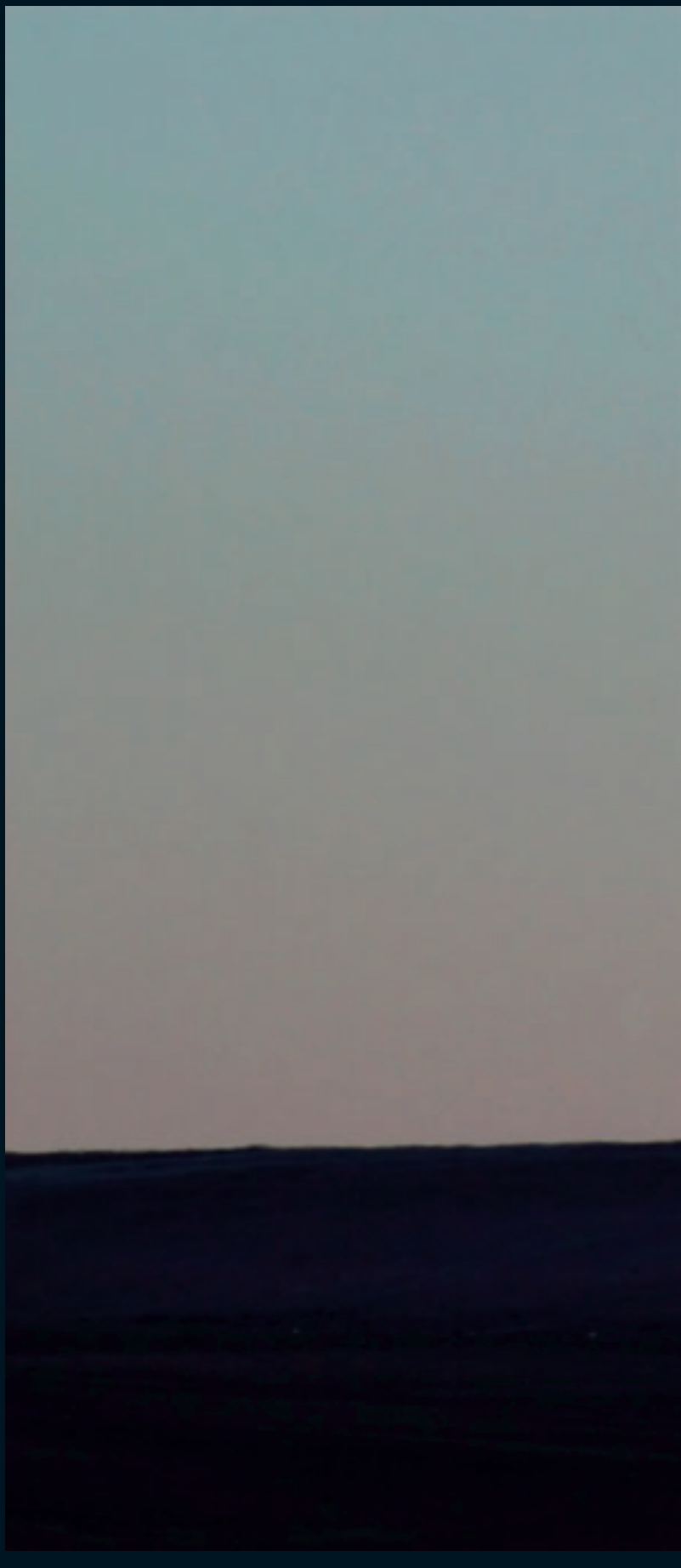
Credit: G. Hüdepohl/ESO



Dramatic Moonset

The full Moon sets on the horizon of the Chajnantor plateau, right behind the APEX telescope. In order to obtain this effect, the picture was taken with a powerful zoom lens, from a few kilometres away. APEX is a 12-metre diameter telescope used to observe the Universe in millimetre- and submillimetre-wavelength radiation.

Credit: G. Gillet/ESO



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Graphic design
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