

# First images from the VLT Survey Telescope 268-megapixel camera

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visible-light telescope that perfectly complements ESO's VISTA infrared survey telescope. New images of the Omega Nebula and the globular cluster Omega Centauri demonstrate the VST's power.

## A New Telescope and Camera

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 under the pristine skies of one of the best observing sites on Earth. The VST is a wide-field survey telescope with a field of view twice as broad as the full Moon. It is the largest telescope in the world designed to exclusively survey the sky in visible light. Over the next few years the VST and its camera OmegaCAM will make several very detailed surveys of the southern sky. All survey data will be made public.

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

"I am very pleased to see the impressive first images from the VST and OmegaCAM. The unique combination of the VST and the VISTA infrared survey telescope will allow many interesting objects to be identified for more detailed follow-up observations with the powerful telescopes of the VLT," says Tim de Zeeuw, the ESO Director General.

(PhysOrg.com) -- The VLT Survey Telescope (VST), the latest addition to ESO's Paranal Observatory, has made its first release of impressive images of the southern sky. The VST is a state-of-the-art 2.6-meter telescope, with the huge 268-megapixel camera OmegaCAM at its heart, which is designed to map the sky both quickly and with very fine image quality. It is a



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

"The VST project has overcome many difficulties but it is now repaying, with its excellent image quality, the expectations of the astronomical community and the efforts of the many people at INAF involved in its construction. I am very pleased to see the VST in operation," adds Tommaso Maccacaro, the President of the Italian National Institute for Astrophysics (INAF).

The VST programme is a joint venture between the INAF - Osservatorio Astronomico di Capodimonte, Naples, Italy and ESO. INAF has designed and built the telescope with the collaboration of leading Italian industries and ESO is responsible for the enclosure and the civil engineering works at the

site. OmegaCAM, the VST's camera, was designed and built by a consortium including institutes in the Netherlands, Germany and Italy with major contributions from ESO. The new facility will be operated by ESO, which will also archive and distribute data from the telescope.

The VST is a state-of-the-art 2.6-metre aperture telescope with an active optics system to keep the mirrors perfectly positioned at all times. At its core, behind large lenses that ensure the best possible image quality, lies the 770 kg OmegaCAM camera, built around 32 CCD detectors, sealed in vacuum, that together create 268-megapixel images.

### **The First Images**

Both the telescope and the camera have been designed to fully exploit the high quality skies at Paranal.

"The superb images now coming from VST and OmegaCAM are a tribute to the hard work of many groups around Europe over many years. We are now looking forward to a rich harvest of science and unexpected discoveries from the VST surveys," adds Massimo Capaccioli, principal investigator of the VST project.

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### **The Surveys**

The VST will make three public surveys over the next five years. The KIDS survey will image several regions of the sky away from the Milky Way. It will further the study of dark matter, dark energy and galaxy evolution, and find many new galaxy clusters and high-redshift quasars. The VST ATLAS survey will cover a larger area of sky and focus on understanding dark energy and supporting more detailed studies using the VLT and other telescopes. The third survey, VPHAS+, will image the central plane of the Milky Way to map the structure of the Galactic disc and its star formation history. VPHAS+ will yield a catalogue of around 500 million objects and will discover many new examples of unusual stars at all stages of their evolution.

The data volume produced by OmegaCAM will be large. About 30 terabytes of raw data will be produced per year and will flow back into data centres in Europe for processing. A novel and sophisticated software system has been developed at Groningen and Naples to handle the very large data flow. The end products from the processing will be huge lists of the objects found, as well as images, and these will be made available to astronomers worldwide for scientific analysis.

"The combination of large field of view, excellent image quality, and the very efficient operations scheme of the VST will produce an enormous wealth of information that will advance many fields of astrophysics," concludes Konrad Kuijken, head of the OmegaCAM consortium.

Provided by ESO

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