Frankfurt museum thrilled by Fraunhofer technology

Disasters are threatening historical cultural treasures. In July 2014, Fraunhofer researchers automatically digitized 3D artifacts in the Frankfurt Liebieghaus sculpture collection, making them accessible for eternity.

CultLab3D, the world’s only 3D scanning facility for cultural artifacts, was in operation inside the Medieval Room of the Frankfurt Liebieghaus sculpture collection from July 21 to 27, 2014. CultLab3D, developed by Fraunhofer IGD, is set to revolutionize the 3D digitalization of cultural artifacts. The artifacts, which are threatened by environmental influences and disasters, are secured in their current state of preservation and made accessible to international research at the same time. So far, this process has been very time-consuming and, thus, expensive.
With CultLab3D, the Fraunhofer researchers are relying on the industrialization and automation of the entire 3D digitization process of artifacts by means of state-of-the-art scan and illumination techniques. The mobile digitalization laboratory thus allows for millions of existing artifacts to be scanned and archived in an industrial, cost-effective, and fast manner.

Using CultLab3D, the Fraunhofer researchers are digitizing genuine cultural artifacts for the first time in a fully automated way in Frankfurt. “In this test run, we gained a great number of very valuable insights,” says Martin Ritz of Fraunhofer IGD. “[Not only] the quality of the different sculptures, but also the conditions in the museum operation, are providing us with some important impetus to further improve CultLab3D.”

This is how the researchers managed to apply the automated scanning process with industrial cameras to very dark and low-contrast objects as well. In the process, CultLab3D does not only capture the geometry and texture of artifacts, but also their optical material properties, such as reflection and absorption behavior. This allows for a “digital replica” with subsequent photo-realistic 3D illustration.

Reducing the cost of 3D scans

So far, 3D scans of art treasures have, for the most part, entailed laborious and cost-intensive manual labor. Due to the higher speed, the Fraunhofer researchers aim to reduce the cost of 3D scans by 10 to 20 times. The outlook of being able to digitize entire collections in the future is very welcome to Professor Vinzenz Brinkmann, head of the collection of antiques at the Liebieghaus sculpture collection. “Whoever knows how we had to work before,” Professor Vinzenz says, “will recognize the great contribution of the scanning facility. Entirely new ways of scientific study will now become available to museums around the world.”

Further Information: www.cultlab3d.eu

Fraunhofer researchers win Best Paper Award at Web3D 2014

Jens Dambruch and Michel Krämer, from the Spatial Information Management competence center of Fraunhofer IGD, presented the results of their “UrbanAPI” research project at the 19th Web3D Conference in Vancouver from August 8 through 10, 2014, where they won the Best Paper Award. In the UrbanAPI research project, Fraunhofer IGD researchers are working on an interactive web portal for citizen involvement and the presentation of 3D city models. In this model, users are able to submit feedback on urban planning and urban-planning drafts in 3D, and even introduce their own ideas in the form of 3D models.

Further Information: http://s.fhg.de/urbanAPI-EN

Fraunhofer aircraft tool awarded as one of the 100 most sustainable solutions

Fraunhofer IGD’s researchers won an award for their environmentally-friendly aircraft tool, “Eco-Design Software Tool,” ENDAMI for short, as one of the 100 most sustainable solutions by Sustania100 in June of 2014, prevailing against more than 900 nominations from all over the world.

ENDAMI is an internet-based software, making it possible to account for the environmental influences of aircraft components right from the design phase. It was developed within the “Clean Sky” research initiative by Fraunhofer IGD and Fraunhofer IBP, the University of Stuttgart, and PE International. The software is providing aircraft designers with direct feedback on the environmental impact of their design decisions. This makes environmentally friendly aircraft construction possible.

Further Information: http://s.fhg.de/ENDAMI-EN
Creating Ship Cabins Virtually on the Computer

Leather, wood, or cloth? So far, the owner had to make these decisions without any visual reference to the actual ship’s interior. Fraunhofer IGD showed how this will be easier in the future at SMM 2014 in Hamburg.

While only engine power and size mattered for yachts in the past, today the focus is mainly on their design with fine materials and top-quality interior furnishing. Designers have had to decide on interior design elements by means of cloth or material samples or by commissioning costly models. Customers only saw what the finished yacht would eventually look like once the construction process was complete. Researchers of Fraunhofer IGD have developed a system to interactively design the interior of yachts prior to their actual construction with the Virtual Maritime Interior Configurator (VI:MAR:CON for short).

By means of VR technologies, the Fraunhofer researchers can create a realistic 3D model of the complete interior furnishings of a yacht. In the process, a device called a meso scanner is used. It scans real materials within minutes, down to the smallest detail, generating precise virtual reproductions. “This combination allows customers to configure their yacht in line with their individual design wishes,” explains Professor Uwe von Lukas, head of the Maritime Graphics competence center at Fraunhofer IGD. “Due to the realistic effect, they will be able to tell whether the selected materials match the interior inside the future yacht even before the first stage of construction begins.” Complaints and elaborate alterations are, therefore, a thing of the past.

Further Information: http://s.fhg.de/VIMARCON-EN

YouTube Podcast

Our Visual Computing Report is also available as a video podcast. We present our most exciting research projects once a quarter on Fraunhofer IGD’s YouTube channel. The second edition is now available, in which our researchers show a process on the biometric on-card comparison and give insight into how the human eye will support the fight against internet crime in the future. Stop by and have a look!

http://s.fhg.de/VCR-VP-02-14
SMM 2014: FRAUNHOFER RESEARCHERS IMPROVE UNDERWATER IMAGES

Videos and images of the submarine world are important for the maritime industry. How underwater images can be improved and evaluated was shown by the researchers of Fraunhofer IGD at the Shipbuilding, Machinery & Marine Technology Trade Fair (SMM) in Hamburg September 9 through 12, 2014.

Due to refraction effects and the optical properties of water, underwater images are usually distorted, noisy, and contain color casts. These effects often render underwater images useless for industrial applications. Fraunhofer IGD is developing processes to significantly improve the quality of such underwater images. “Once the underwater images have been color-corrected and deblurred, we are able to evaluate them in detail and gain information of all kinds,” explains Professor Uwe Freiherr von Lukas, head of the Maritime Graphics competence center at Fraunhofer IGD. By means of the information gained, the underwater world can then be optically measured and reconstructed three-dimensionally. This opens up new possibilities for the inspection of offshore installations, the automated documentation of living creatures, or underwater archeology.

Suppliers of the submarine data are divers or special diving robots, such as Remotely Operated Vehicles (ROVs for short), or Autonomous Underwater Vehicles (AUVs for short). They are often already equipped with camera systems and take individual images or videos underwater. The devices transmit these images and videos directly from the water to a control or monitoring center. “Our work aims at realtime-capable solutions to assist various users directly in their underwater work,” explains von Lukas.

Further Information: http://s.fhg.de/Deep-Fish-Tank-EN