Live pictures in 3D

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A design engineer's job is never easy – designing exhaust pipes, packaging or industrial plant demands considerable ingenuity. Researchers at the Fraunhofer Institute for Telecommunications, Heinrich-Hertz Institut HHI can help, with a new 3D display solution called Free2C. At CeBIT, the team will be demonstrating a variety of applications for the 3D monitor that works without special glasses.

Pictures from Mars, hazardous industrial environments, operating rooms, or of components or a colleague on the other side of the world deliver a more realistic effect when displayed in 3D. This aspect is also important for design engineers, whether they are designing aircraft, new houses or parts for cars. The drafting and designing work is still performed as

usual in two dimensions. "We can link the display to a traditional CAD workstation," explains Klaus Schenke from HHI. "The designer works as normal, except that with the click of a button, the component currently being worked on can be displayed in 3D. This makes it easier to assess the final design and its functionality."

The monitor displays the objects in three dimensions with photo-realistic quality. The models appear to be freely suspended in front of the monitor, similar to a hologram. In order to provide a sense of depth on a two-dimensional display, the system generates two separate images, one for the right eye and one for the left. These images are broken down into fine vertical strips and arranged in alternating sequence side by side. A special lens in front of the display handles the proper optical addressing, replacing the shutter glasses that are usually needed for the effect. The curved surface of the lens diffracts the light from the display in two directions. The beams assigned to the right eye are »shifted« slightly to the right, those intended for the left eye to the left. So that the viewer always receives the proper images for the corresponding eye, a camera affixed to the monitor records the position of the head. If the user moves, the lens array are automatically shifted to adjust to the new line of sight.

Trade show visitors will be able to test for themselves what live 3D images look like using their own likeness. A stereo camera will be installed at the stand. The pictures it takes will be forwarded directly to the display, where they will be used to generate the images – live, in color and in 3D. "What at first may sound like just another trade show stunt actually has a consequential background," according to Schenke. "Designers and contractors from different cities or even different parts of the world can use this method to discuss plans, including the spatial aspects, but without the need for shutter glasses or expensive virtual reality rooms." Another scenario concerns the use of robots, which are often controlled manually during dangerous assignments, such as

disarming bombs or searching for fire victims. Images that have depth would simplify the work of robot controllers. Because the operator sees a realistic image, almost as if he were actually on the scene, he can control the robot with a much higher degree of precision.