



The 3D KineMatrix interactive kinetic sculpture, revealed for the first time in February 2017 at the ISE trade show in Amsterdam, creates a magical interplay of water and colored light.

Kinetic sculpture interacts with water and light

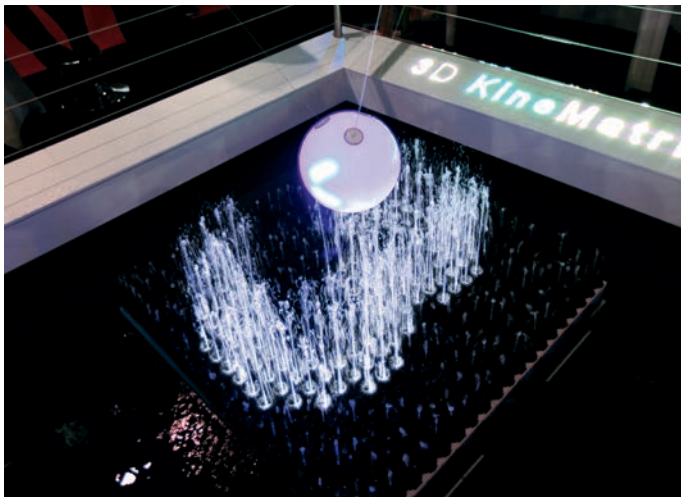
A fascinating play of water, light and movement

Development of sophisticated and technically challenging trick fountains that entertain and amaze has sparked the imagination of engineers for centuries. The interactive kinetic sculpture revealed for the first time in February 2017 at the ISE trade show in Amsterdam creates a magical interplay of water and colored light. The "3D KineMatrix" was developed by MKT Fine Exhibition Engineering, a proven expert in the design, development and implementation of interactive installations and kinetic sculptures. This project was completed in cooperation with HB-Laser, a world-renowned specialist in laser shows, multimedia and video mapping projects.

“We set a goal to combine our experience and create something unique out of the individual products, i.e. the ‘3D HydroMatrix’ developed by HB-Laser and our kinetics expertise,” explains Axel Haschkamp, member of the board at MKT. The result is a magical 3D sculpture using water, light and motion: a white ball appears to float weightlessly above the water matrix, moving in oscillating and circular motions. At times, it balances on the tips of the water fountains. At other times, it submerges below the water. The next moment it seems as though the ball itself were directing the dynamic upward and downward movement of the water matrix. The sophisticated choreography controlling the interaction between water, light and the kinetic sculpture is difficult to decipher, and viewers never tire of watching the interplay.

Modular and scalable: interactive sculpture flexibly adapts to individual locations

The sculpture is designed for indoor applications with limited space. These locations include hotel lobbies, malls, corporate foyers, airports, casinos and amusement parks. Essentially, it is ideal anywhere people want to create emotions, entertain or promote relaxation for spectators. The investment in a custom sculpture, which involves an enormous amount of planning and development, often exceeds the budget of the architects or clients. With the KineMatrix, MKT and HB-Laser have now created a modular solution that can be flexibly adapted to individual locations.



The product is based on the 3D HydroMatrix modules developed by HB-Laser. Equipped with 10 jets and 10 RGBW LEDs, they include all of the components required to create water and light installations. Depending on the location and scope of the application, multiple modules can be compiled in individual or serial configurations of any desired size as a star or square shape. According to Harald Bohlinger, Managing Director of HB-Laser, the flexible design and compact size are what make this interactive sculpture so unique: “There is currently no other system on the market that offers this 3D effect from such a short distance. In order to create this stunning effect, the system that we have implemented enables water jet spacing of only 50 mm, while conventional water fountains require a minimum spacing of 300 to 400 mm. Furthermore, the minimal spacing between the LED water fountains also enables the projection of videos or lettering onto the water with pixel-level resolution.”

Both the water-light matrix and the kinetic assembly are flexibly scalable and can be adapted to the specific application scenario. Instead of a ball, any desired object can be moved three-dimensionally in the space above the 3D HydroMatrix in order to interact with water and light. The KineMatrix can also be flexibly combined with other media such as video, lasers, light, audio and fog.

Precision motion control makes a splash

A prerequisite for the modularity and scalability of the 3D KineMatrix is a compact control platform that can be scaled and adapted to individual project requirements in terms of dimensions and complexity. The three-dimensional movement of the ball, as used in the presentation at the ISE, is created by three winches. The motion control platform consists of a Beckhoff servomotor with an integrated holding brake, an EL7201-0010 servomotor I/O terminal with One Cable Technology (which integrates a complete servo amplifier, including encoder system in a 12 mm terminal housing), and a brake-chopper I/O terminal that provides brake resistance. A Beckhoff CX2030 Embedded PC serves as the central control unit. The control system contains the complete show procedure, with cable lengths and timings taken from an externally generated CSV file. TwinCAT NC PTP Motion Control software then carries out highly-precise position calculations. A TwinCAT Camming function block performs the linear or spline interpolation of the master support points and the corresponding slave



The interactive sculpture was designed for indoor applications. The modular design can be easily adapted to the specific architectural conditions of all kind of sites.

positions according to the position table. This creates a seemingly flowing motion for the observers. In order to synchronize the kinetics with the water matrix control sequence, which is saved on a circuit board, the control system sends the values to a higher-level master PC via ADS. This master PC also runs the application's visualization software.

Further information:

www.hb-laser.com

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