

First Ever Interior 3D Map of Tower of Pisa



Australian researchers have created the first ever interior 3D map of Italy's iconic Leaning Tower of Pisa by using a breakthrough mobile laser mapping system. Developed by CSIRO, Australia's national science agency, the Zebedee technology is a handheld 3D mapping system incorporating a laser scanner that sways on a spring to capture millions of detailed measurements of a site as fast as an operator can walk through it. Specialised software then converts the system's laser data into a detailed 3D map.

While the tower's cramped stairs and complex architecture have prevented previous mapping technologies from capturing its interior, Zebedee has enabled the researchers to finally create the first comprehensive 3D map of the entire building.

Dr Jonathan Roberts, research director at CSIRO's Computational Informatics Division, explained that this technology is ideal for cultural heritage mapping, which is usually very time consuming and labour intensive. It can often take a whole research team a number of days or even weeks to map a site with the accuracy and detail of what can now be produced in a few hours.

Within 20 minutes the team was able to use Zebedee to complete an entire scan of the building's interior. This allowed them to create a uniquely comprehensive and accurate 3D map of the tower's structure and composition, including small details in the stairs and stonework.

During 'Project Pisa', CSIRO also collaborated with local Italian scientists from Scuola Superiore Sant'Anna (SSSA) who believe the research will have significant impact on preserving the cultural heritage of the site.

The detailed record of the Leaning Tower of Pisa may one day be critical in being able to reconstruct the site if it was to suffer catastrophic damage due to natural disasters such as a fire or an earthquake. Having a detailed 3D model of the world's most significant cultural heritage sites could also be used to allow people who cannot physically visit these sites to better understand and appreciate their history and architecture, explained Franco Tecchia, assistant professor at the PERCRO - Perceptual Robotics lab.

In 2012, CSIRO through its Digital Productivity and Services Flagship worked with 3D Laser Mapping, a global developer of laser scanning solutions to commercialise the Zebedee research into the ZEB1 product. As well as its applications in cultural heritage, ZEB1 is also being used to increase efficiencies and improve productivity in a number of different industries. For example, the technology is already assisting mining companies to better manage their operations and helping security forces to quickly scan crime scenes.