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A new imaging system produces 3-D models of monuments using unmanned aircraft

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To develop this system, University of Granada researchers used an unmanned aerial vehicle (UAV), which is an aircraft without a human pilot onboard. This system produces a realistic reproduction of architectural models at a lo

University of Granada researchers have developed a 3D imaging system that scans 3D models of historical buildings using data obtained from an unmanned aerial vehicle (UAV)–an aircraft without a human pilot onboard. This is the first 3D imaging system to combine the use of UAVs, image-based 3D modeling technologies, and virtual representation of models to produce a realistic modeling of 3D objects from images.

The endpoint of this project is to obtain a 3D model of a historical building façade –as a cathedral–without any human intervention and at a lower cost than other technologies currently available (as 3D scanners). To date, UAVs have been used in many research fields, as they are fast and they can overfly abrupt areas, avoid large obstacles and provide information from multiple sensors.

No Scaffolding or Cranes

While UAVs autonomy is limited, they can descend for an operator to change the battery (an operation requiring just a few seconds), and then resume its task. This way, the object can be scanned in record time without the need for scaffolding or cranes.

As regards 3D-digitalization technologies, they can provide a realistic modeling of 3D objects from images obtained from sensors, stereoscopic cameras, multiple geolocated images obtained from different angles, etc. Finally, virtual reality technologies produce realistc high-quality 3D images (similar to those on 3D movies).

The multiple applications of this technology are evident, as they offer an autonomous device that in just some minutes can scan a façade with as much or a higher precision than 3D scanners. It is noteworthy that this device can get close to the object up to a few inches to obtain the smallest and unreachable details.

This project focused on façade 3D imaging is intended to prove the applicability of this new technology to any type of architectural model: buildings, monuments, etc. What these objects have in common is that digitalization is performed in vertical parameters and that objects are geolocalized.

Financing from CEI BioTic

Different University of Granada research groups have participated in this project: the Grupo de Modelos de Decisión y Optimización (MODO), the Grupo de investigación en Informática Gráfica (GIIG); the University of Granada Virtual Reality Laboratory and the companies Intelligenia Dynamics and Virtum Graphics, which are University of Granada spin-offs and are aggregated to the Biotic Campus of International Excellence (CE). In fact the CIE will support this research project.

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