

# COLORIMETRIC 3D LASER SCANNER FOR TERRESTRIAL, UNDERWATER AND RADIOACTIVE ENVIRONMENTS

**Innovations and benefits** - Laser scanning systems are ideal for 3D reconstruction as in applications requiring versatility, high accuracy and total safety for the scanned objects.

The innovation consists in the utilization of three laser beams (red @ 660 nm, green 517 nm and blue @ @ 441 nm) modulated in amplitude for the punctual and simultaneous acquisition of the color and structure information. This technology has been applied to three different fields corresponding to three prototypes of terrestrial applications for the simultaneous acquisition of distance and colour information up to 30m, colorimetric and structural variations of the scene or objects; underwater scanner for reconstruction of submerged scenes and object (cable and fuel pipelines) and, eventually, for nuclear applications, where the system can be used for structurally monitoring environments exposed to high-radiation.

**Uses** - The laser scanning system is a versatile tool to be used also in hostile environments, such as nuclear underwater and under critical lightness conditions (strong presence or absence of light) being based on three laser beams (red, green and blue) integrated in a passive optical head, linked to the control. Such instruments allow to reconstruct, at a very high resolution, environments and/or objects to be later used for a virtual graphic reproduction or in case of reverse engineering (reproducing objects with computer control machines). Possible users: managers/restorers/users of cultural heritage, industry; managers of nuclear and underwater transport facilities.

**Past and Present Activities** - The terrestrial scanning system (patent no. RM0006212006 internationally converted into PCT 2097715) successfully used for remote monitoring of prestige works of art (the Sistine Chapel's vault and Judgement day and, in 2014, Riace's Bronzes have been scanned), reconstructing high-definition 3D colour models. The underwater scanner will be used for surveys in the Gulf of Gaeta for digital scanning and following high-resolution 3D colour reconstruction of a submerged archaeological area dating back to the Roman age. The nuclear scanner is under development for the ongoing EDEN project, for surveys inside the reactor core cooling pools of nuclear plants.

