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- Fraunhofer Institute for Telecommunications HHI
- Fraunhofer Institute for Physical Measurement Techniques IPM
- Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB
- Fraunhofer Institute for Applied Polymer Research IAP
- Fraunhofer Institute for Material and Beam Technology IWS
- Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT
- Staatliche Kunstsammlungen Dresden (Dresden State Art Collections)

<http://s.fhg.de/cultural-heritage>

 **Forschungsallianz
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NOVEL DAMAGE AND MATERIAL ANALYSIS IN 3D





FRAUNHOFER INNOVATIONS FOR CULTURAL HERITAGE, SUBPROJECT “SCULPTURES”: NOVEL DAMAGE AND MATERIAL ANALYSIS IN 3D

Motivation

Interest in 3D digitization and visualization has steadily increased in the cultural heritage sector over the last years, and 3D technologies are now used for conservation, presentation, and interaction in various ways.

3D models reproduce the geometry, texture, and material properties; in short, they show an object’s outside. However, additional data regarding the inside has not been included in 3D models so far. A visual preparation of cultural artifacts with information on their material composition and potentially existing damages is yet to be done.

Aim and Implementation

The subproject “Sculptures: Novel damage and material analysis in 3D” aims at the virtual presentation of objects

including their intrinsic properties. Hence, non-destructive methods (3D digitization, confocal microscopy, terahertz technology, and mobile ultrasonic tomography) are combined for the first time in order to extensively analyze the condition of artifacts.

The acquired data on the object’s internal and external structure is brought together in a consolidated 3D model and annotated afterwards. 3D content is then visualized in real space on a so-called Floating Image Display. These 3D visualizations allow for a sound damage and material analysis as well as for an optimized conservation.

Innovation

The subproject “Sculptures” combines novel technologies developed by Fraunhofer for the first time and opens new possibilities for monitoring, analyzing, and virtually presenting objects far beyond the cultural heritage sector.

“Sculptures” is part of the pilot project “Fraunhofer innovations for cultural heritage” in cooperation with the Staatliche Kunstsammlungen Dresden (Dresden State Art Collections) and is coordinated by Fraunhofer IGD and IBMT.