A MISSION UNDER THE AUTHORITY OF

ARAB REPUBLIC OF EGYPT
MINISTRY OF ANTIQUITIES

CONCEIVED AND COORDINATED BY

FACULTY OF ENGINEERING
CAIRO UNIVERSITY

HIP
HERITAGE
INNOVATION
PRESERVATION
HIP.INSTITUTE

Press Release - Cairo - the 11th of November 2015

End of the first phase of the #ScanPyramids mission

Conclusion: Thermal anomalies observed on all monuments, including Khufu Pyramid

Background

The Faculty of Engineering, Cairo University, and the HIP.Institute (Heritage, Innovation, Preservation) launched, on October 25, 2015, under the authority of the Egyptian Ministry of Antiquities, the #ScanPyramids project (www.scanpyramids.org) aiming at « scanning », for over a year, the largest pyramids of Egypt: Khufu, Khafre, the Bent and the Red Pyramids. #ScanPyramids combines several non-invasive and non-destructive scanning techniques in order to try to detect the presence of any unknown internal structures and cavities in ancient monuments, which may lead to a better understanding of their structure and their construction processes / techniques.

Technologies used are mix of infrared thermography, muon radiography and 3D reconstruction. (Cf. http://www.hip.institute/press/HIP_INSTITUTE_CP2_EN.pdf)

The first phase of #ScanPyramids have just ended this Sunday, November 8th 2015. A short infrared mission was implemented (Cf. http://www.scanpyramids.org/layout/spm/press/About_ScanPyramids-en.pdf) in order to detect, at different times of the day and night, thermal surface anomalies on the pyramids. The aim of the first mission was to prepare for the following phases of the project which will allow further and longer investigations. During the same first phase, the same protocol, was applied for 24 hours in the tomb of Tutankhamun at the Valley of the Kings (cf. http://www.hip.institute/press/HIP_INSTITUTE_CP3_EN.pdf), responding to a formal request of the Permanent committee of the Egyptian Supreme Council of Antiquities,

Methodology

Thermal measurements, performed at different times, allowed to observe the pyramids during their warm-up phase (early morning until sunrise) and during their cooling phase (late afternoon until sun set and early night). In cooling phase, the heat transfer is usually happening from the inside to the outside; while in heating phase, it is the opposite. If an object is full, that is to say, built with blocks of the same material and have an identical "heat emissivity", one should not observe any brutal temperature differences. To the contrary, if there are heterogeneities in the structure (type of material, cavity… etc.), we should observe temperature differences as some parts will heat up or cool down faster due to difference in "heat emissivity".

Conclusions

At the end of the First mission of #ScanPyramids, the teams of the Faculty of Engineering, Cairo University, and the HIP.Institute have concluded the existence of several thermal anomalies that were observed on all monuments, during the heating up or the cooling down phases. To explain such anomalies, a lot of hypothesis and possibilities could be drawn up from those observations: Presence of voids behind the surface, internal air currents, different materials with specific thermal capacity, etc.

Among the various identified thermal anomalies, the team have observed a particularly impressive one located on the Eastern side of the Khufu Pyramid at ground level:

It is particularly interesting to observe that While sometimes temperature differences of 0.1 to 0.5 degrees are detected between two adjacent stones from limestone of different qualities, the #Scanpyramids Infrared team has detected in this zone an area of few blocks having up to 6 degrees gap with neighboring blocks! This area should be the subject of further investigation during the subsequent phases of the project.

All anomalies detected and data collected will now be subject to further treatment and data analysis. During the next phase of the #ScanPyramids project, several formulation of hypotheses will be done. The team in cooperation with the engineers of Dassault Systèmes, HIP Institute's partner,should start a 3D modeling and simulations of the Giza plateau, which will definitely lead to a better understanding of the plans and the techniques of Pyramids constructions.

THANK YOU to add the copyrights mentioned in the enclosed text files “HIP.INSTITUTE on Behalf of Faculty of Engineering & Ministry of Antiquities”

PICTURES

Tutankhamun Tomb infrared campaign, pictures available here:
http://www.hip.institute/press/pictures/Pictures_HIP.Institute_King_Tut_Infrared_tests.zip

Phase 1 Scan Pyramids infrared campaign, pictures available here:
http://www.hip.institute/press/pictures/Pictures_HIP.Institute_ScanPyramids_Phase1.zip

East side of Khuhu Pyramid, pictures of the thermal anomaly available here:
http://www.hip.institute/press/pictures/Pictures_HIP.Institute_Thermal_Anomaly.zip

VIDEOS

Video footage (Uploaded at 7.45pm GMT+1) of the infrared campaign on all pyramids (up to 3 min max with “Hip Institute” copyright), please request the links by writing to contact@hip.institute

Official website: http://www.hip.institute
#ScanPyramids: http://www.scanpyramids.org
Twitter account: @HIP_i_

Press contact for HIP.Institute:
Patricia Attar – Gen-G Agency - +33 1 44 94 83 66 – patricia.attar@gen-g.com