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Press Release
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# The CEA (French Alternative Energies and Atomic Energy Commission – France) joins ScanPyramids mission.

#ScanPyramids project (www.scanpyramids.org) was launched on 25 October 2015 under the authority of the Egyptian Ministry of Antiquities and is led by Faculty of Engineering, Cairo University, and HIP.Institute (www.hip.institute) , Paris (Heritage, Innovation and Preservation Institute). This project aims at scanning, over a year, some of the Egyptian Pyramids: 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. This mission is using, today, Infrared thermography, muon tomography and 3D reconstruction techniques.

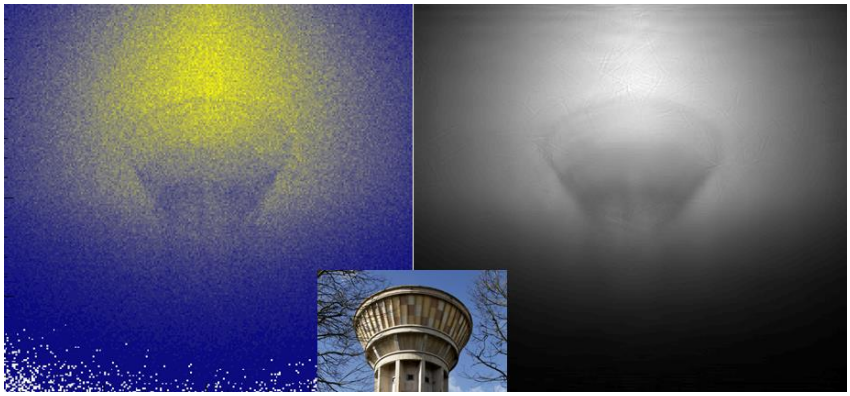
Several international scientific institutions were already part of #ScanPyramids: Nagoya University (Japan), KEK (High Energy Accelerator Research Organization – Tsukuba – Japan) for muon tomography and Laval University (Quebec – Canada) for infrared thermography.

Today, after having submitted the request to the Egyptian Ministry of Antiquities, #ScanPyramids welcomes a new team of researchers belonging to the CEA (French Alternative Energies and Atomic Energy Commission) and precisely to the Irfu (Institute of Research into the Fundamental Laws of the Universe).

Since the launching of the project, the Irfu's team started showing interest to bring its know-how in muon tomography. This team is developing, since many years, micro-pattern gas detectors, called Micromegas. More and more precise, they are usually used to reconstruct particles tracks for many scientific experiences in high energy physics. The CEA Micromegas have been, for example, installed in the Thomas Jefferson National Accelerator Facility (US). By using those unique in the world detectors, the CEA team has built dedicated muon telescopes for #ScanPyramids mission. They are actually under construction and being tested in the CEA laboratories at Saclay (France).

This new generation of muons telescopes will complete the other muons techniques conceived in Japan. The Japanese devices are used inside the pyramids while the CEA telescopes will be used outside of the pyramids.

Here is a video summing up the Muons operations in 2016:
www.vimeo.com/hipinstitute/muons



Picture 1 : Gaz detectors assembly in one of the CEA Clean-Rooms (see credits below)
Picture 2 :Muons telescope assembly (see credits below)
Picture 3: Muon Imagery of Water Tower CEA-Saclay (copyright : Irfu/CEA)

## About CEA

The French Alternative Energies and Atomic Energy Commission (CEA) is a public research organization working in four main areas: defense and security, nuclear and renewable energies, technological research for industry and fundamental research.
Building on its recognized expertise, the CEA takes part in implementing cooperation projects with a wide range of academic and industrial partners. With its 16,000 researchers and employees, it is a major player in European research and is also expanding its international presence. More information: www.cea.fr

## VIDEO

www.vimeo.com/hipinstitute/muons

## PICTURES

http://www.hip.institute/press/pictures/Pictures_HIP.Institute_CEA_Announcement.zip

## COPYRIGHT

All rights of the project and its outputs, including Video, Pictures, News, and all Electronic Outputs are reserved to the Egyptian Ministry of Antiquities, HIP Institute and the Faculty of Engineering (Cairo University).

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