

Ambiente

Partner Search HUNGARY - Environment

01 dicembre 2017

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----- PARTNER SEARCH ENV-PT-EPN-3 -----

<Reference n.: ENV-PT-EPN-3>

<Deadline: 25/2/2007>

<Programme: > Environment (incl climate change)

<Project Title: SPANTHEON: environment-friendly dome structures >

<Financial Scheme: > Small collaborative project

<Description: Topic ENV.2008.3.1.5.1

The ultimate built environment, the ideal "green habitat", will supply its own energy requirements, it will not emit CO₂ into the atmosphere, its air will be clean and oxygen rich, its vegetation evergreen, its climate ever-summer. At the present levels of industrialization and population concentration in Europe, this ultimate goal can only be achieved through atmospheric separation, by building such habitats under giant, transparent domes.

For the past 40 years extensive R+D efforts have been conducted in many countries, aimed at constructing giant, transparent domes, which will provide such controlled, ideal environments for large eco-systems. But, in spite of these efforts, none of today's known technologies can build domes with clear spans longer than 250 m. This is due to the fact, that with increasing spans bending moments increase exponentially, and so larger structures become too heavy. This Proposal is based on a new Hungarian invention, the Spanttheon system, which makes it possible to build giant dome structures of unprecedented large sizes. The Spanttheon system eliminates bending

moments from the supporting arches, by suspending the prestressed membrane roof below the arches, using suspension cables through a series of blocks (pulleys). This mechanism converts nature's asymmetrical, random membrane loads (snow and wind) into symmetrical and identical arch loads, which do not cause bending moments.

This technological breakthrough has received International Patent WO 2006/136867. It is described in www.spantheon.com and was featured in the December 2007 issue of the Journal of the International Association of Shell and Spatial Structures. The 3-nation Consortium of this Proposal will include the Technical University of Budapest, and Spantheon's Inventor.

We propose to fully evaluate and design (with option to build) a Spantheon structure to cover a habitat, either already existing, or to be built, its area potentially exceeding 1 million m².

The enclosure will provide hermetic seal against polluted air entering from the outside. Minimal interior CO₂ emission will be absorbed by evergreen vegetation, which will also supply the entire oxygen supply required for the habitat. The single-season (all summer) climate of the habitat will support evergreen, tropical or rain-forest vegetation. Such vegetation shall be selected and adapted to the given soil to provide maximum oxygen production and CO₂ absorption. Select other vegetation to provide continuous food supply.

The membrane will be made of special, transparent (glass clear) ETFE foil, which transmits (unlike glass) 100% of the UV rays, required for the vegetation's photosynthesis.

The habitat will supply its own required energy, mainly from solar and geothermal sources (the ratios of direct use to electric conversion shall be optimized). In the calm interior of the dome large sheets of shading, photovoltaic panels, reflective mirrors, etc. will be readily extended and reconfigured. The membrane's three layers of transparent ETFE foil (with the enclosed two airspaces) will provide very economical thermal insulation, since the dome's surface will minimal, relative to the airspace it enclosing. Therefore controlling the temperature of the entire airspace of the dome, instead of the individual homes, will mean very substantial savings in the overall cost of energy, and in the building cost of the homes.

During snowfall the warm inside air will be rising to the outer foil, to melt off the snow load, thereby reducing the structure's weight (and cost), and also increasing its maximum clear span capacity. The habitat's primary water source will be rain (and melted snow), which will be collected along the dome's perimeter

<excerpt>

<Organisation Type: SME>

<Partner Sought: Not specified>