

A MOON BASE ON EARTH

What has the MercuryHouseOne (MHO) to do with a moon base? Well, besides its transportability, the fact that this design has been inspired by our aerospace experience – notably in research projects for moon bases and Mars rovers. But our intimacy with spaceflight has also led us in defining a few principles and many details.

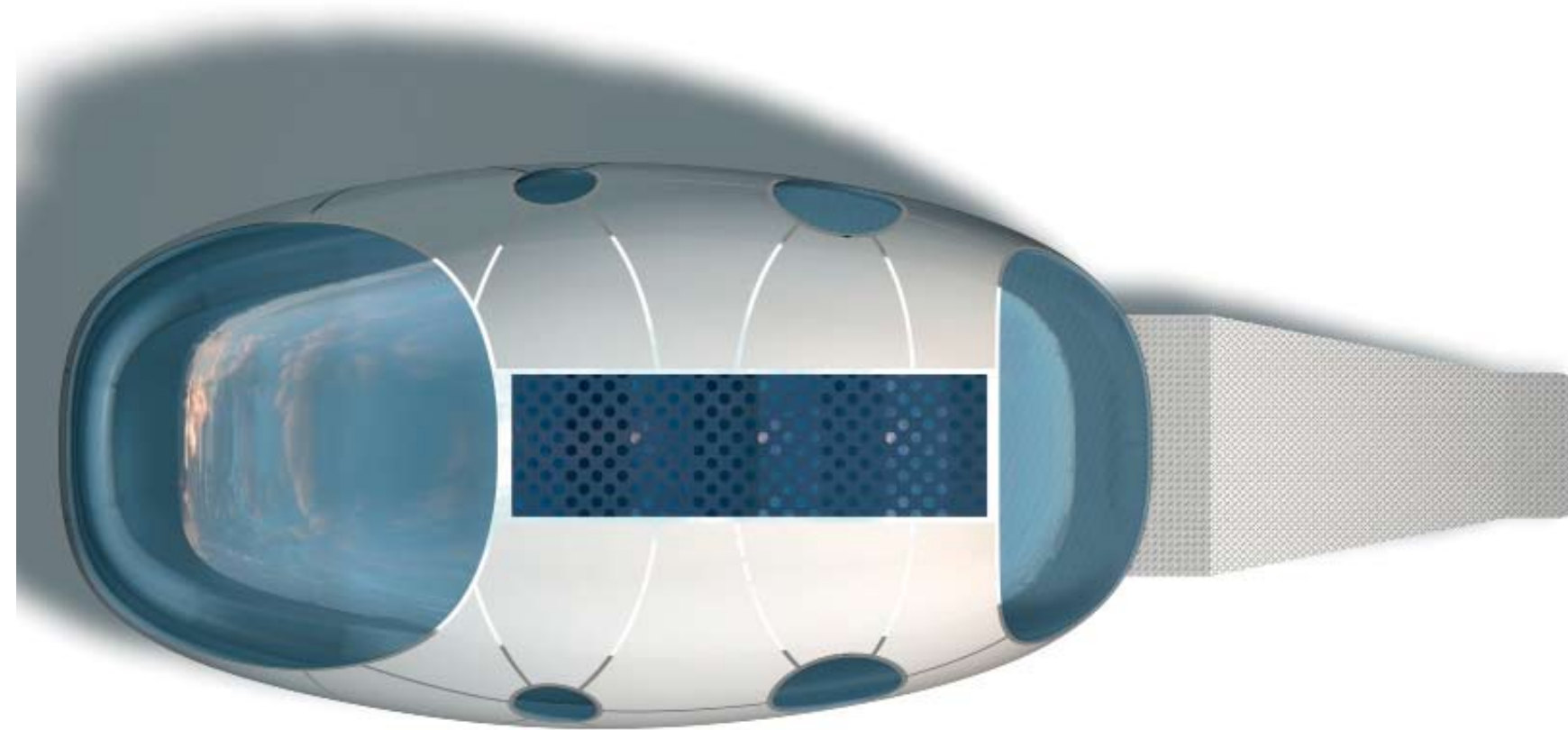
The original concept was born as result of our ongoing study for new styles of living, new kinds of mobile homes. The MHO project, in fact, explores the idea of moving forward from the tradition of “boxes on wheels”, typical of classic caravans.

In essence, MHO is a mobile pod that, without any foundation work, can be easily set up in a natural environment, or other particular locations, yet conceived to offer a comfortable soft interior that can be used for different activities. As a unique structure in special environments, it is meant to enhance peoples’ experience thanks to a modern organic shape that finds its ancestry in a time well before spaceflight: Etruscan caverns.

The MercuryHouseOne Project

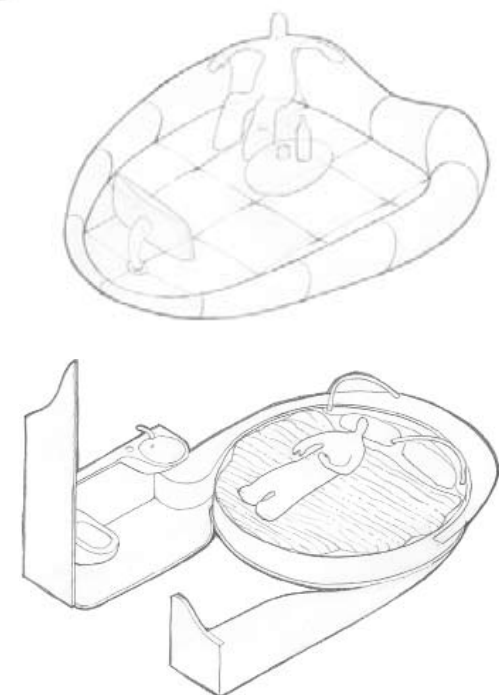
Arturo Vittori
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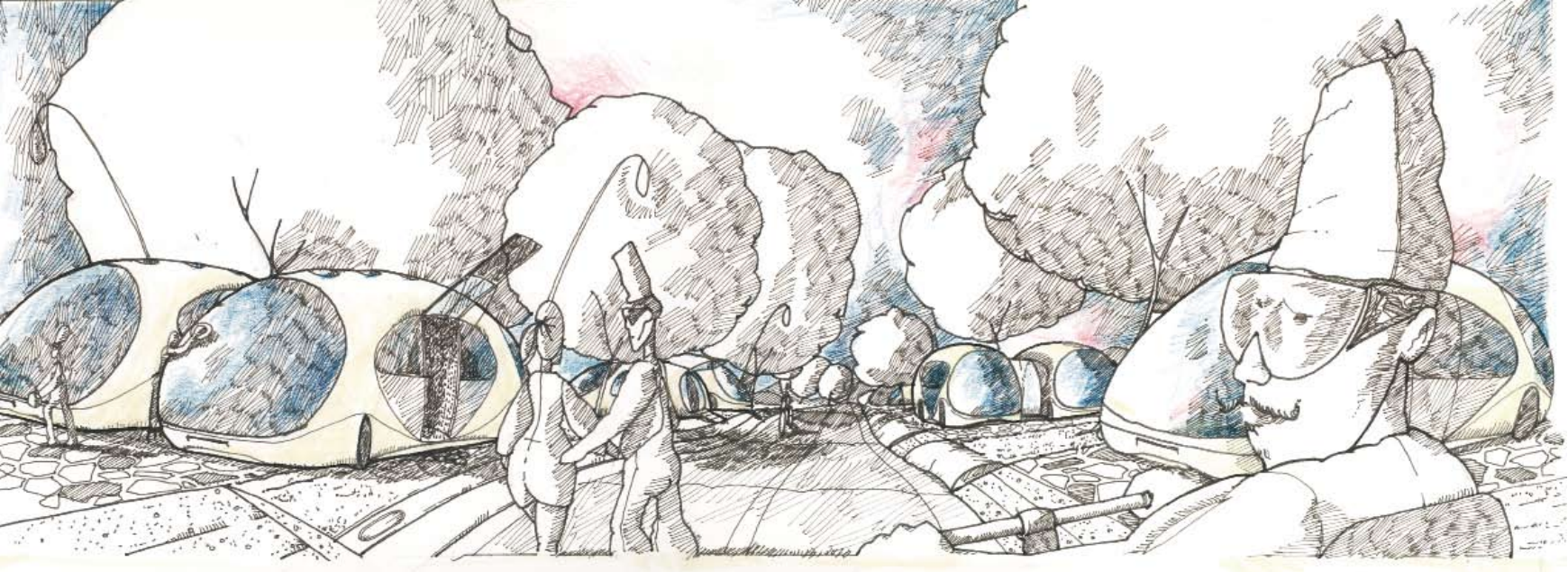
We had been studying the MHO design for years. When we finally found a real application, the client wanted the thing as big as possible, yet easily moveable. This has been the first practical design challenge, and space engineering provided us with a solution. Because in most countries there are limitations on oversize road transportation, after investigating the possibilities and costs of using special vehicles, we decided to define the width of the pavilion identical to that of a standard module of the International Space Station ISS, which happens to be exactly 4,477 mm. These modules are transported all over Europe, and the world, to



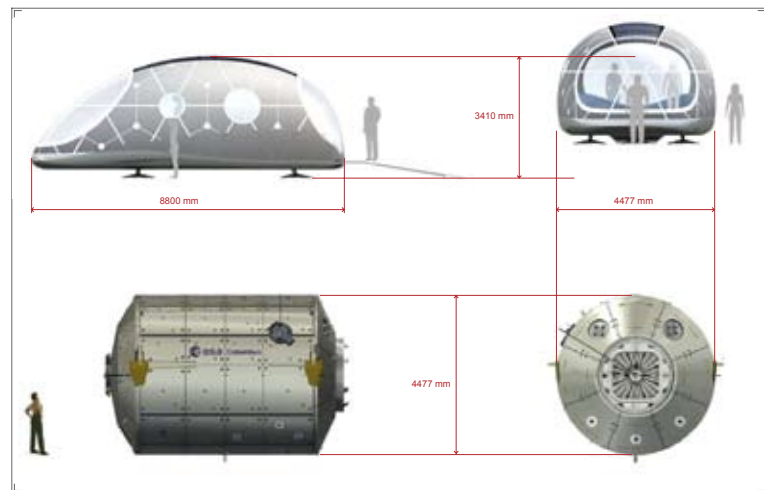
be eventually flown to space from NASA Kennedy Space Center in Florida. In our case, such size could also assure a comfortable standing height while gifting the structure with aesthetically pleasant proportions. Moreover, its weight could stay within the possibility of helicopter transport by a safe margin. It is an odd coincidence that these dimensions were frozen on a meeting held on the very same day as the launch of the European Columbus module to the International Space Station.

Eventually to be placed on earth, not on the moon, the MHO can take advantage of terrestrial ingenuity and somewhat relaxed specifications, so we decided to exploit advanced boat building technology. As structural hull, we used a double layer of glass fibre, with a foam core in between, to create a sandwich with improved stiffness and thermal properties. The pod touches the ground with only three points, thus avoiding the instability of rigid hyperstatic structures. These feet, made out of an aluminium alloy, can be adjusted with a pneumatic system to set the pad perfectly levelled.





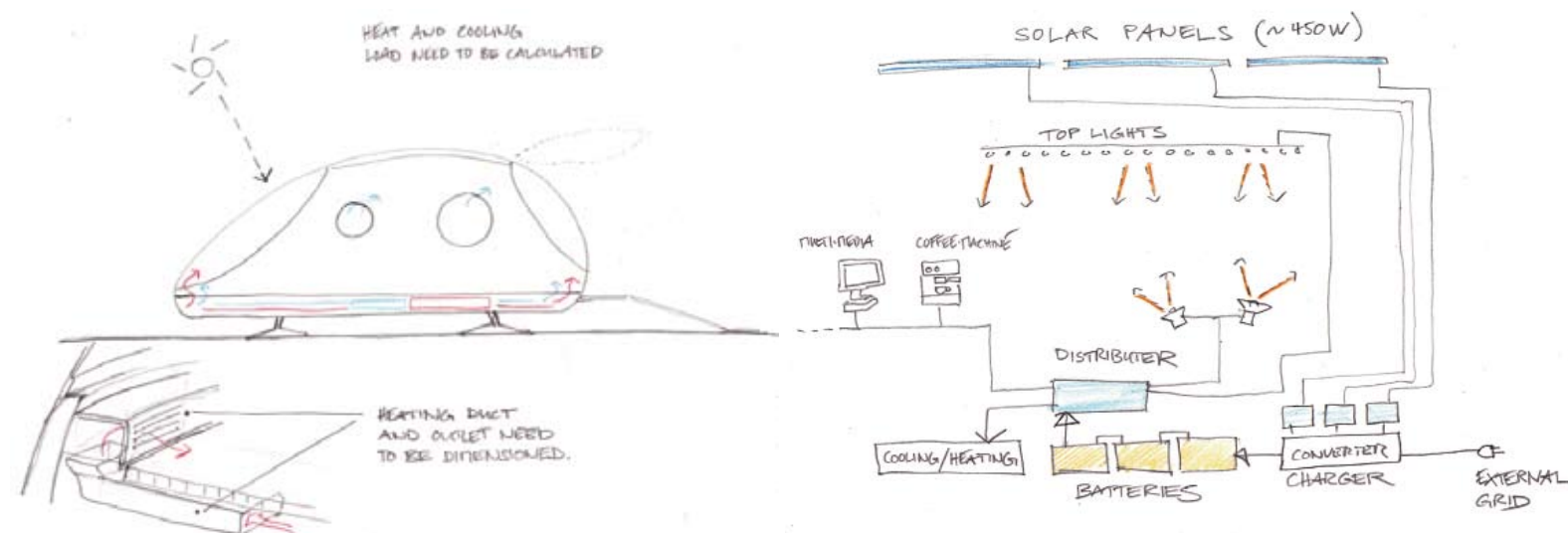
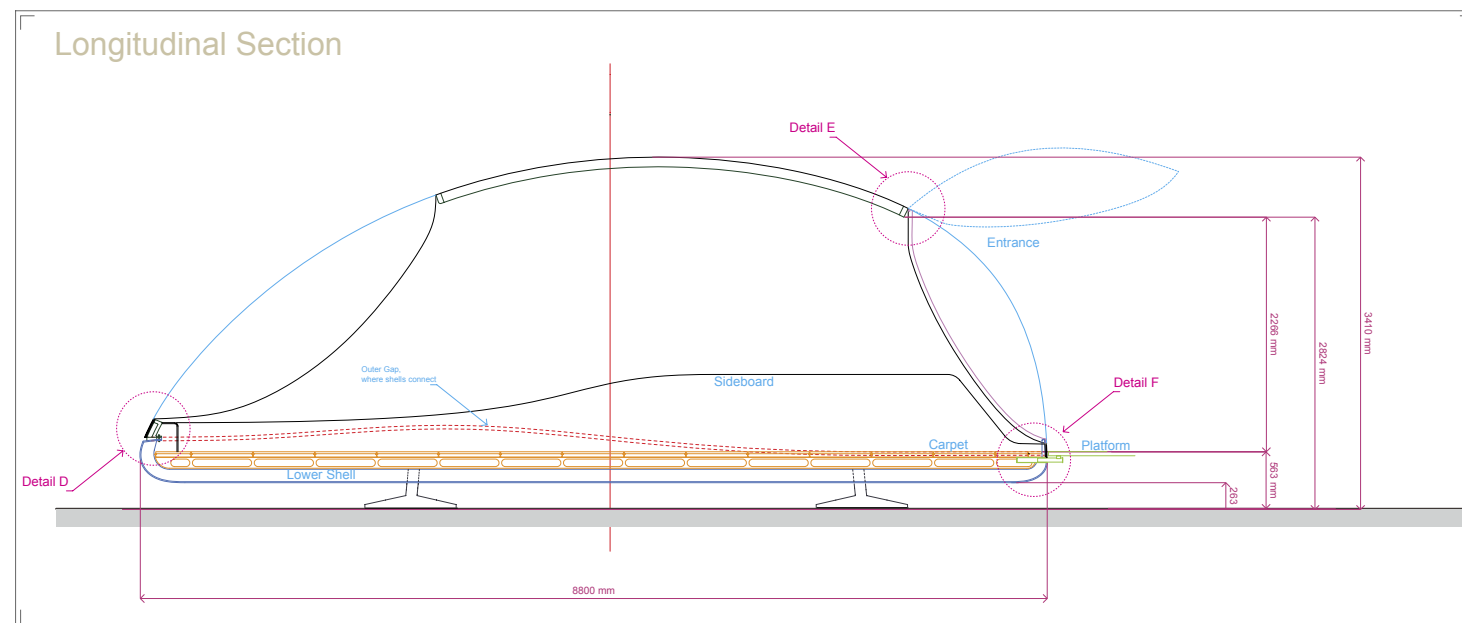
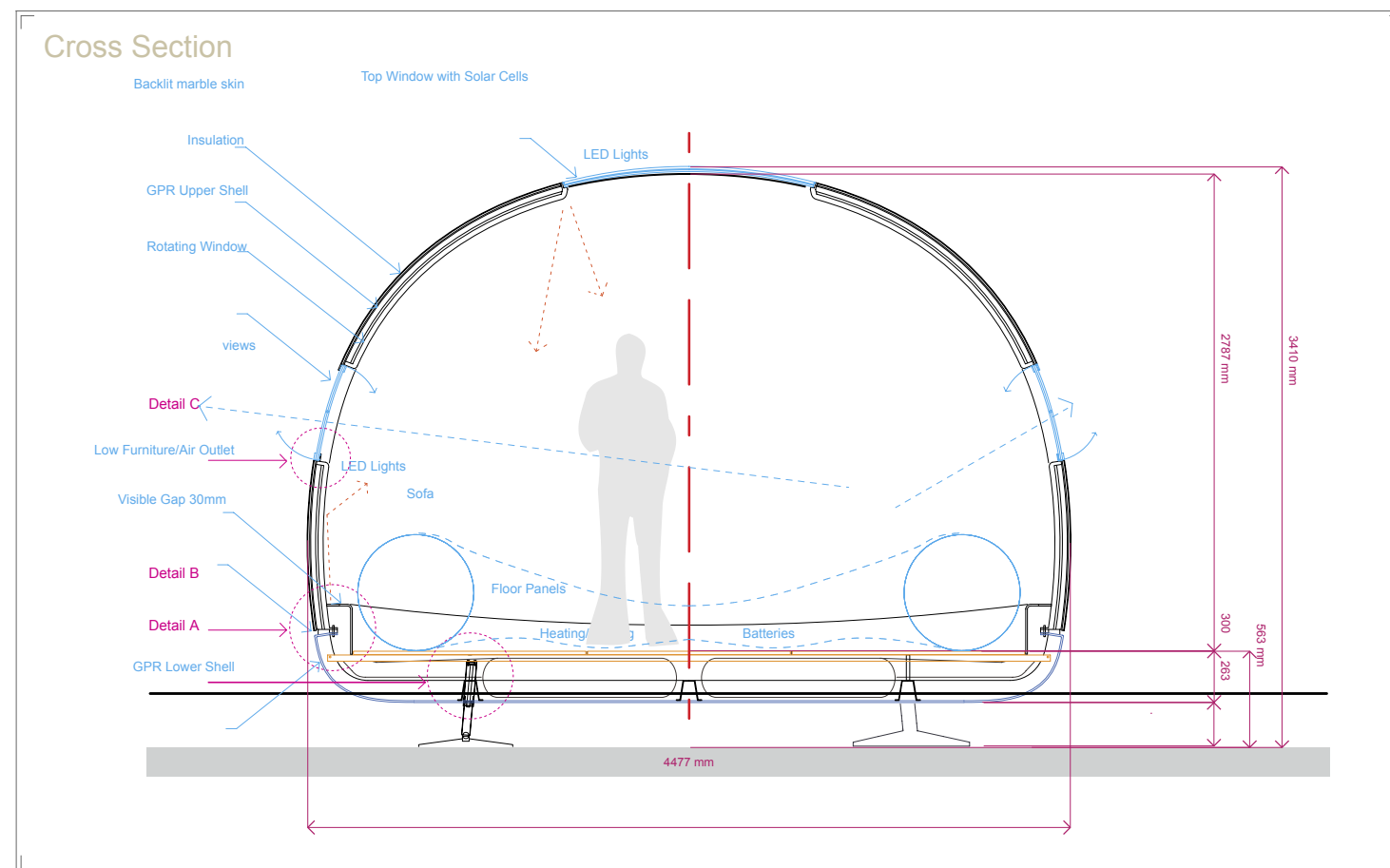
The external skin is an essential part of the concept, determining the distinctive quality of the pod. In this first application our client, GVM, presented us with an unexpected and challenging request. The pavilion was to be a showcase for their new technology: backlit light-weight marble tiles. These innovative cladding elements are made of 4mm thick white Carrara sculptural marble mounted on an aluminum honeycomb plate. Glued directly on the back of the marble there is an electroluminescent film that makes its external surface glow in the night of a surreal light reminding us of - guess what? - moonlight. This type of cladding presents not only a technological challenge, but also a geometrical one. How to tile a three-dimensional shape with flat tiles of an economical dimension, keeping the gaps between the panels as small as possible? We are still working to investigate several solutions, including circular and elliptical shapes.

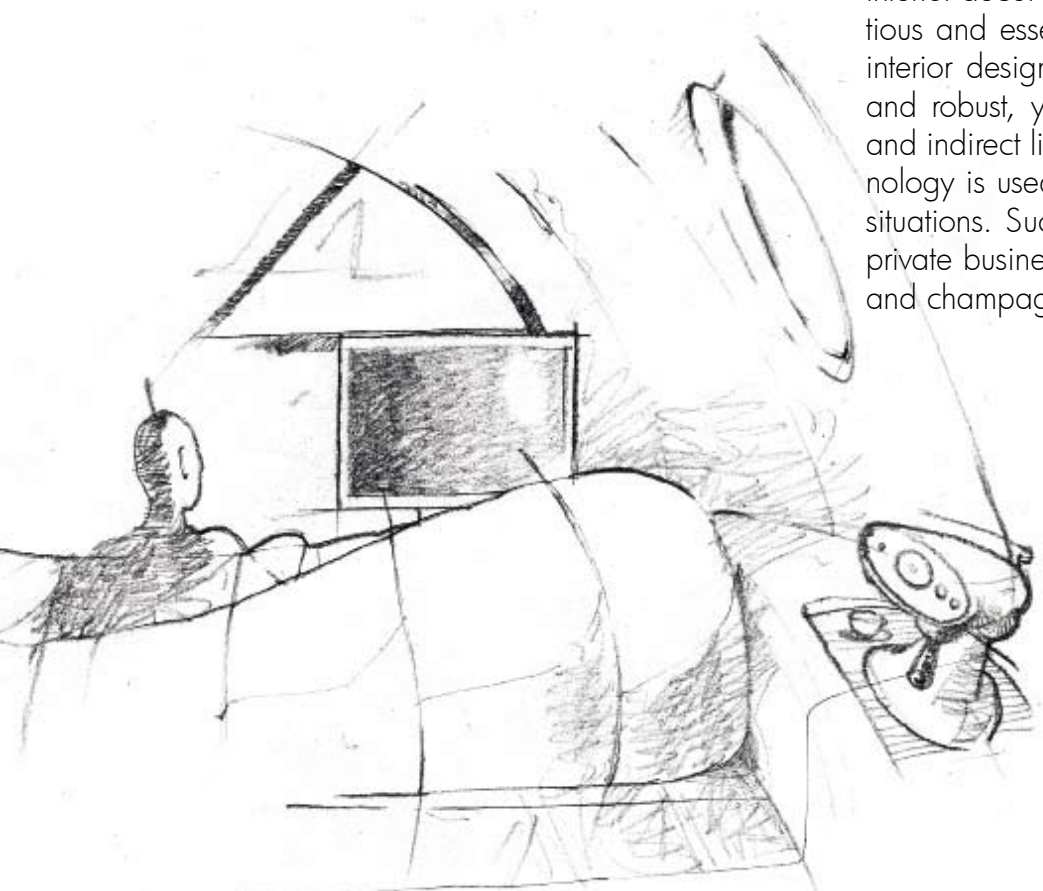


The very large-scale windows of our design confronted us with another difficulty to overcome. Although modern technology can bond acrylic glass with invisible seams, to manufacture such huge three-dimensional surfaces generated by the NURBS algorithms of the CAD engine was not practical. Therefore, to contain the size of the openings within standard factory formats used for acrylic glass, normally 2030 x 3050 mm, we explored several possibilities to subdivide the windows in smaller panels with frames. In the process, we also studied how engineers and designers had dealt with similar problems in other fields, for instance in helicopters.

On the rooftop window the acrylic glass integrates translucent solar cells. We used a thin film crystal technology that allows slight bending and therefore can be bonded between two layers of curved acrylic glass. They will be charging the batteries of the pavilion during daytime.

The interior of the MHO typically consists of an entrance zone and a large sofa, with enough room to allow people to stand, sit or just find any other position they feel comfortable with. The furniture is integrated in the two sides and contains utilities like a small refrigerator, coffee machine, water supply and a sound system, but other options are available for use as presentation room, think tank or even private cabin.





The services of the MHO are positioned under the floor where batteries, electric panels, heating and cooling unit can be accessed lifting a few concealed trapdoors. The interior décor has been styled to be first class, but unpretentious and essential, inspired by our experience of aircraft interior design that leads to the use of low maintenance and robust, yet high quality fabrics and surfaces. Direct and indirect light is freely mixed while advanced LED technology is used to adjust brightness and colour to different situations. Such 'mood-light' can be tuned to support VIP private business meetings as well as romantic candle-light and champagne dinner situations in a moonlit night.

