MOVING LANDSCAPES

Homero Flores
Dynamic landscapes will host the Copenhagen EXPO. These will be seven floating islands, each representing a continent, with a dynamic surface in the vertical and horizontal directions. After the EXPO these islands will for part of the new urban development of the city, Nordhavnen.

Blocks of different sizes will form each island. These blocks and their combinations will provide various services, for example, space for walking, playing sports, dinning, attending concerts, pavilions, or parks.

The theme of the EXPO will be A WORLD WITH NO BORDERS, that will focus on the physical planet, its natural wonders, and the culture, arts and technology of the human race. The dynamic landscapes represent the changing physical world in which we live in.

The various blocks that form this space are floating in the harbor, and can move and shift their location simply by detaching from each other or from the land. This allows change of the configuration and location of the floating landscape, spontaneity in its form, and adaptability of its functions. This also allows the islands to visit other parts of the city and thus engage Copenhagen as a whole, not just the Nordhavnen and downtown neighborhoods.

Each island will be smart. This means that it will automatically configure its locations, and horizontal and vertical configuration. Wirelessly it will communicate with each of its elements, and sensors will inform it about the social interactions taking place, weather, and proximity to the land and harbor bottom.

The elements will slide along each other by installing frictionless edges. They will connect with hooks. These conforming blocks will propel with small jets located on each of their sides, very much like space ships. They will be powered by internal batteries recharged wirelessly.

The width of the smallest blocks will be of ten by ten meters, and the largest a couple of hundreds of meters long, and less than one hundred meters wide. The structure of these blocks will made of concrete and steel as some marine platforms are build, but their surface will covered with wood similar to that seen in existing shore parks in the region.

The flexible form of the islands will allow them to mold to water edges within the city. This will create a cozy European city like feeling for the EXPO, in contrasts to past expositions where the EXPO site is far from the city center.

**EXPO THEME**

The theme of the EXPO will be the physical Earth, and the culture and arts of its people. The idea is to forget about branding, be it a commercial brand or a nation. Each island will represent a continent that will showcase its natural treasures and why they are relevant to the human race. As well as its culture and arts, including ancient and modern technology and science. There will be seven islands: Asia, Africa, North America, South America, Antarctica, Europe and Australia. Each island will configure to the shape of the continent it represents during the EXPO. The size of each of them will be proportional to the size of the continent it represents.

**Collaboration among nations**

The countries belonging to each continent will need to collaborate with each other to set up the EXPO. This will provide an experimental set up of international collaboration (like John Lenon’s Imagine ‘Imagine there’s no countries…) that can later be extrapolated outside of the EXPO.
Renderings of these landscapes, some of them within Nordhavnen and Copenhagen for scale.
Visitors to the EXPO will have a new experience as Land and Sea merge through the moving landscapes. The way the EXPO site looks will change every day. The surface of the smaller cubes will be wood and will be painted of different colors to create a more vivid image of the continent the island represents. The elevation field will showcase one pavilion/building or will hide it. The range of elevations changes will be at the most 4 meters. Paths will form among the elements so that people can walk through it (i.e., they won’t be able to climb a 2 m difference in elevation, but paths will allow people to go there (or not, some elements could be put off the access to the public on some days)).

The coziness of the EXPO next to the city center will foster the use of public spaces and interaction among its dwellers.

The fact that it is attached to the land permits citizens to bike or walk to it, without the need of more complex modes of transportation such as boats or cars.

Climate: it will provide for warmth during cold weather, and beach during warm weather.

With this project we aim to make the space attractive so people want to be in it. The means to do so are identified in “New City Life” (Gehl et al., 2006). This interaction is beneficial for the EXPO and Nordhavnen because it stimulates a sense of community, safety, and economic development.

Places within the city that this space will try to emulate in terms of social impact are those with a vibrant confluence of people, such as Nyhavn (busy restaurant/bar street by next to fishing boats), Kongenshave (large park where people sunbathe in the summer), and the Harbour Park at Islands Brygge (a long strip next to the harbour where skating parks, swimming pools, and sunbathing green patches lie busy with people during the summer).
Ghel’s measurements

Ghel et al., 2006 have identified twelve measures of public space quality that should be addressed. These are divided in three categories: protection, comfort and enjoyment. Protection includes measure of safety, crime rates, and protection against weather/pollution. The Comfort measures include easiness to walk (into and within), stand/stay, sit, see, talk/listen, play/excursion. The Enjoyment category includes measures of scale (that is, that buildings are not huge), climate, and ‘sensory’ (meaning that the space has things that excite our senses). The proposed project has the potential to score high in all these measurements.
Above: representation of Nordhavnen where a development master plan includes the construction of housing and working place for forty thousand people in the next fifty years or so. Currently it is underdeveloped and an industrial harbor operates in the area.

Below: Rendering of a topographic surface that resembles the idea proposed for the moving landscapes because the illustration is made with squares.

URBAN INTERACTIONS

Setting the EXPO right in downtown Copenhagen will allow the visitors to experience the city and the EXPO immediately, in contrast to past expositions where the EXPO site was far from downtown. At the same time, the islands can provide lodging and services to the visitor, thus reducing the strain on the city services.

Image courtesy of Senseable City Lab
Below: Rendering of various of the moving landscapes surrounding Nordhavnen and connected to the downtown of the City of Copenhagen.
The elements of the island will have a similar structure to barges. They will have tanks that fill with water to sink in, and with air to float, similarly to submarines.

The blocks forming the moving landscapes will slide along their edges when they are moving through their non-friction edges. A combination of bearings will reduce the friction. To link the elements, articulated magnetic connections will form at their edges at the water surface level. The articulations will allow a degree of freedom in their movement as water waves move through the landscape.

Each block forming the island will be able to move by its own power with propellers installed on them.

The energy requirements for movement will be small given that these elements will move slowly and therefore it is possible to power them wirelessly.

The island should be controlled automatically and be intelligent. It should send the climatological conditions, and know how to protect the space from the cold wind, or connect the city to the water edge on a warm day.

This 'intelligence', aided by sensor of depth, proximity of other vessels, etc, from each of its elements, and the function of the buildings and spaces it hosts, will steer the moving landscape.

TECHNOLOGY DESCRIPTION

Swimming platform that is only used in the summer. During the rest of the year it could have other uses if it were dynamic and transformed itself into a small plaza, close to the shore, protected from the wind and the rain.

Seattle, WA
This wooden structure seems able to move in the vertical direction when water floods the zone, by buoyancy. The granite column looks like a guide for the movement.

Image is courtesy of Ann Woods
Sense and Sustainability

The buildings in the Copenhagen EXPO will not be wasted. They will form part of a new development: Nordhavnen.

Image is courtesy of Ann Woods
Homero Flores

I was born and raised in Mexico City and its surroundings. I have been struck since an early age by the speed at which the city and its surroundings changed with very little concern of the government or society on the impact of these changes. I think such changes should be better planned, and I hope one day to have a chance to do just that. I obtained a C. E. degree to improve my chances (UNAM, 2001). Then I specialized in Hydrology (M. S. MIT 2004, and PhD MIT 2010). Now I study how the landscape evolves over hundreds or thousands of years as water fluxes erode and sculpt it. But I also enjoy understanding what happens within minutes and days. For example, the tight link between energy and water fluxes in the biosphere. The interconnectedness between water and energy fluxes has a significant control on the patterns of climate we experience in the world. I find this fascinating. And I think that this interconnectedness can be greatly exploited in the design of the built environment.

In engineering aesthetics usually are not important but they are to me. For the past ten years I have been drawn to photography, drawing, and dance. I think that these arts feed my aesthetic sensitivity. I would like to get more involve with these activities. I think this is possible within the context the intersection of engineering and architecture/design.

I love living abroad and traveling. I learn from the experience and the people I meet, from a cultural and technological perspective.