BEE AT HOME

1. PROJECT AREA

Bikoro (0°45'S 18°07'E) is a urban settlement that counts about 7.500 inhabitants, located in a rural area in the discrict of Équateur in the Democratic Republic of Congo (Africa), on the west side of Tumba Lake; it is located 128 km south from Mbandaka, chief town of the district.
The territory is crossed by the National Road n°8 which connects Bikoro to Mbandaka; Tumba Lake offers another access to the territory through Congo River.
In this part of Equateur District there are other small towns similar to Bikoro, located along Congo River and completely surrounded by nature.
The choice of the project site derives from the consultation of "Plan National de Développement Sanitaire PNDS – Republique Democratique du Congo", in which, among the various sites identified for the future construction of healthcare facilities, there is the city of Bikoro.
The main access to the city is a secondary driveway that branches off the National Road n°8.
The project site is located on the edge of the urban aggregation, adjacent to the access road to Bikoro, and it is bordered by the lush forest of palm trees that surrounds the city.
On the driveway of access to Bikoro, in fact, the tree-lined driveway connects to the entrance area of the CHC (the lobby).

HEALTHCARE FACILITIES
Most of the healthcare facilities in the region are precarious structures mainly for the supply of medicines.
In the Province of Equateur there are 3 permanent hospitals and 52 health centers, located near the most populated cities, and therefore distant from rural contexts such as the one we considered.

CLIMATE ANALYSIS
In the equatorial zone the temperatures are stable all year round and the rains are abundant (they oscillate around 1,700 mm per year).

2. PROJECT CONCEPT

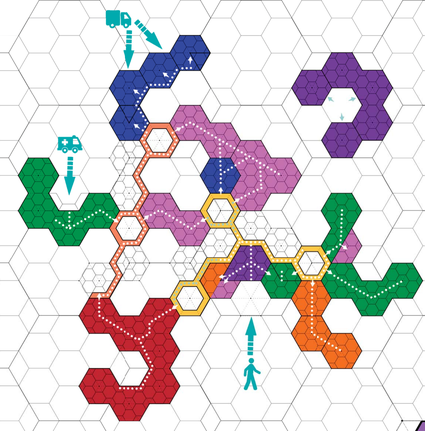
The concept of the project stems from the desire to create an environment that recalls the typical aggregative forms of the area (in particular the aggregation that characterizes the typical African villages of huts) and that fits harmoniously into the natural environment of the project area. For this reason, the building is divided into clusters.
On the other hand there is the desire to create an environment that is as welcoming and comfortable as possible for those who live it: considering the catchment area (not only the population of Bikoro but also that of rural villages scattered throughout the territory) and the habits typical of local populations, the need arises to think of spaces that can accommodate not only the patient but also the family that will move with him to the CHC and that will temporarily settle near the health facility.

3. PROJECT

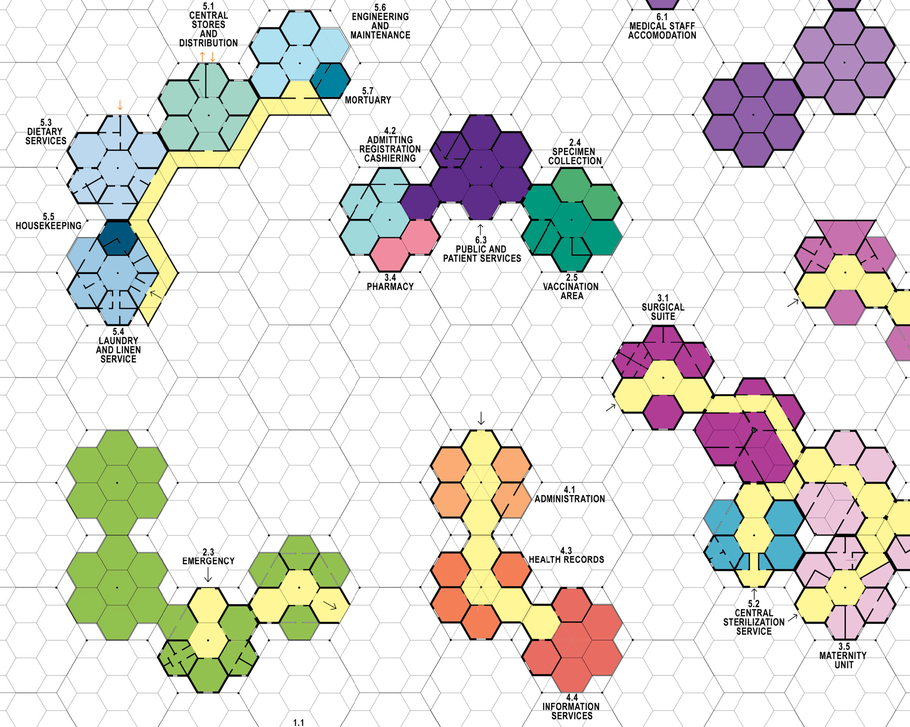
The project is divided into two autonomous sub-systems: the infrastructural system, to which the structural and plant functions are associated, and the environmental system, which is the result of the modular aggregation of the spatial units.

INFRASTRUCTURAL SYSTEM
The first element of the system is a hexagonal structural matrix composed of six vertical steel tubular uprights arranged on the vertices of a hexagonal perimeter of 8.40 meters side and of a central upright placed in the middle of the hexagon. On the uprights a basic grid is inserted: it constitutes the zero level set of warps, raised from the ground.
The spatial configuration that derives from the aggregation of several hexagonal matrices forms a succession of pavilions covered by inclined roofs.
Each pavilion is equipped with a light cover in waterproof fabric supported by steel cables anchored to the structural uprights that ensures water tightness and shading; the roof is also equipped with a photovoltaic system with integrated solar cells.
The rainwater is conveyed in downpipes integrated to the uprights of the infrastructural grid towards a collection system that allows an accumulation of water for the drains and for the irrigation of the external green areas.
The aggregative system of the structural mesh has been conceived to reproduce a structure with open courts connected by connective elements; the courtyards guarantee a double front opened towards the outside, maximizing the possibility of facing and cross ventilation for an adequate natural air exchange.
PREFABRICATED MODULES
The hexagonal aggregative system of the infrastructural mesh is also repeated for the modular elements that define the confined spaces of the CHC.
The choice of the hexagonal module allows flexibility in the use of space and allows a reduction in the number of modules: the central hexagon is in fact the result of the combination of surrounding modules, and this allows a reduction of joint complexity as on each node converge three elements.
For reasons related to ease of transport, the hexagonal module is designed as a composition of two trapezoidal sub-elements obtained from the division of the hexagon on the diagonal. For larger rooms (such as operating theaters), a second type of module has been designed, again with a hexagonal shape obtained from trapezoidal sub-elements, but with larger dimensions.
Both types of modules are made of concrete panels, in order to have a good degree of thermal inertia despite the reduced thickness.

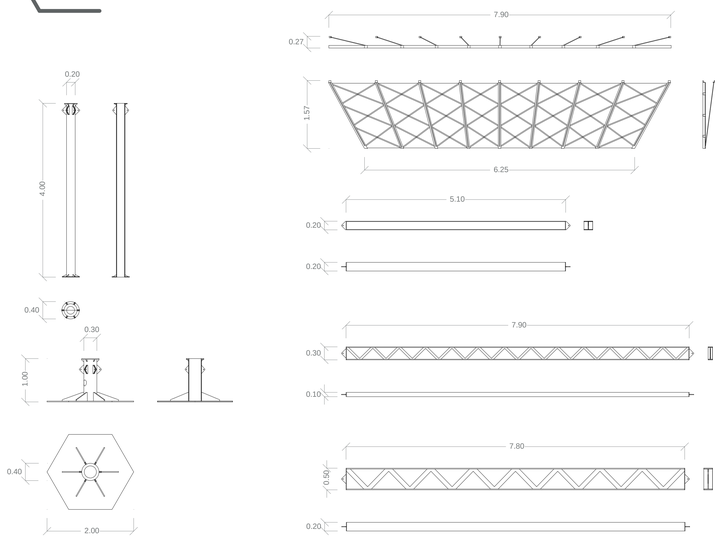
AGGREGATION SYSTEM: INFRASTRUCTURAL SYSTEM + MODULES
The aggregation of the hexagonal infrastructural elements develops open court clusters that are articulated along the main circulation, evoking the informal aggregation of units around a central space, typical of the local villages.
The same planimetric configuration occurs within the infrastructural element that houses the prefabricated modules.
The articulated trend of the elevations made up of three-dimensional modules with a hexagonal plan, produces a spatial articulation that associates the functional aspect of reduction of the exposed surface with the direct sunlight radiation to the formal effect of the chiaroscuro.
The connection hexagons, configure covered open spaces separate the departments thus decreasing the width of the building and allow to create informal spaces potentially usable not only by those who work in the CHC and for inpatients, but also by those accompanying them and for the community.



1 INPATIENT UNITS
2 AMBULATORY CARE
3 DIAGNOSTIC AND TREATMENT SERVICES
4 ADMINISTRATIVE SERVICES
5 SUPPORT SERVICES
6 STAFF AND PUBLIC SERVICES
MAIN CIRCULATION
MEDICAL CIRCULATION

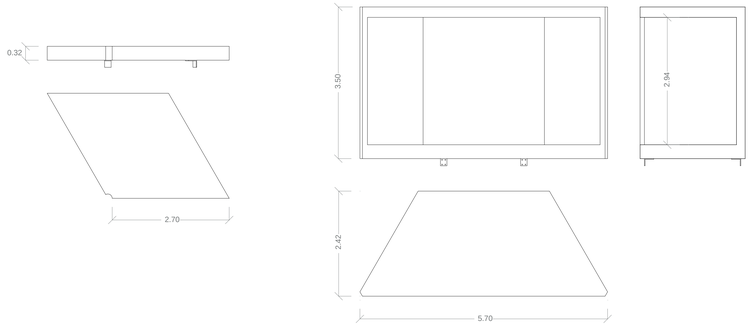


INFRASTRUCTURAL ELEMENTS

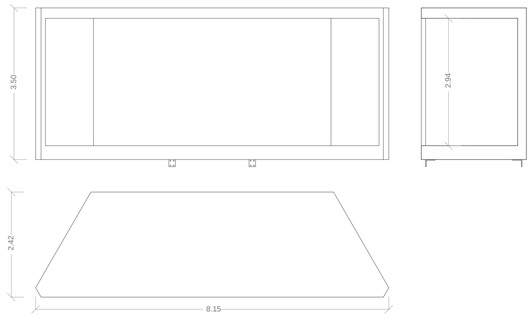


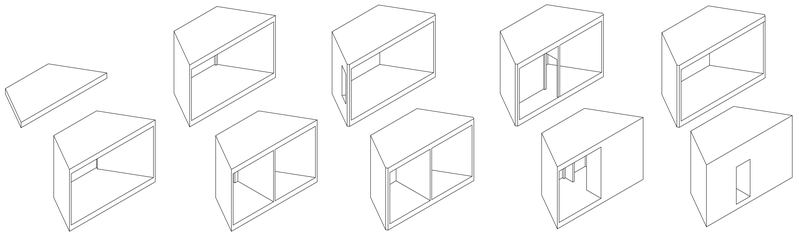
SPATIAL ELEMENTS

3D REGULAR UNIT

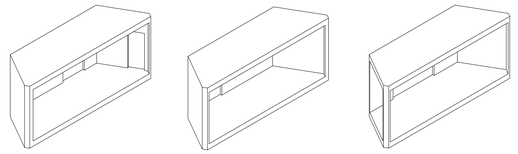


3D SPECIAL UNIT
Operating Rooms and Circulation



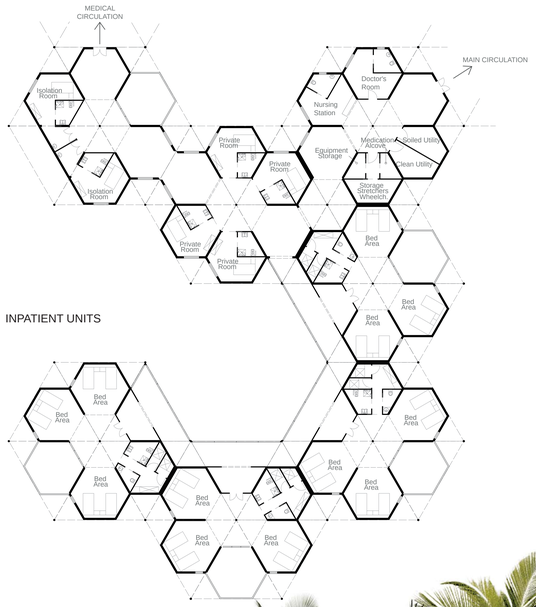


POSSIBLE CONFIGURATIONS



FUNCTIONAL EXAMPLES

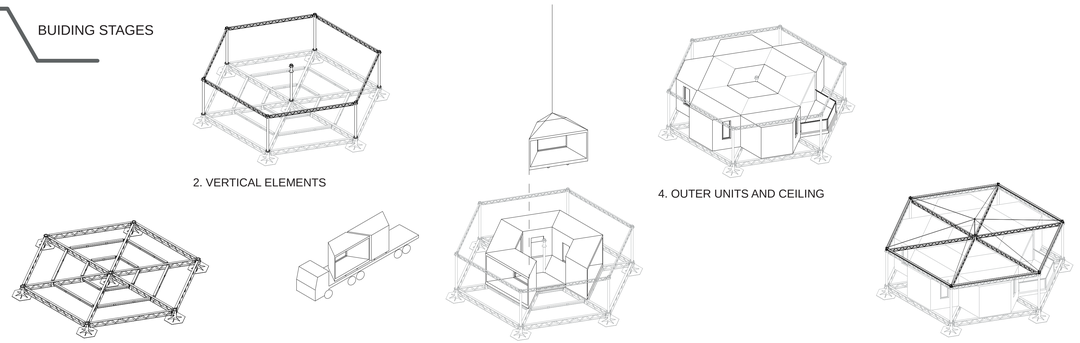
Scale 1:200



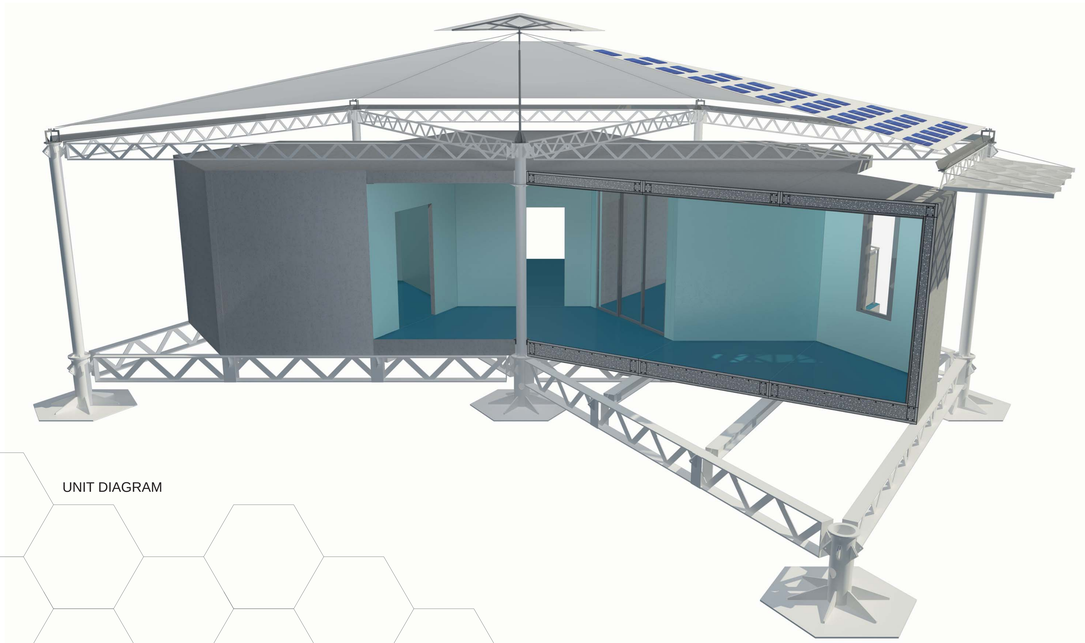
OPERATING THEATRES

INPATIENT UNITS

BUIDING STAGES

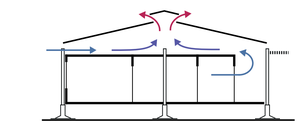


1. PLATFORM
2. VERTICAL ELEMENTS
3. INNER UNITS AND FLOOR
4. OUTER UNITS AND CEILING
5. ROOF STRUCTURE
6. ROOF MEMBRANE AND SHADES

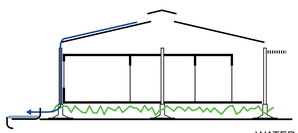


UNIT DIAGRAM

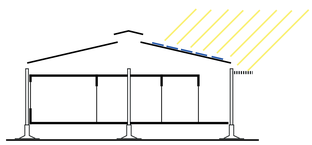
ENVIRONMENTAL SYSTEM DIAGRAMS



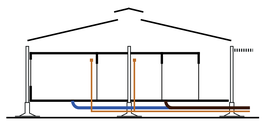
AIR CIRCULATION / NATURAL VENTILATION



WATER COLLECTION



PHOTOVOLTAIC ELEMENTS AND SOLAR SHADING



ELECTRICAL, WATER AND WASTE SYSTEMS