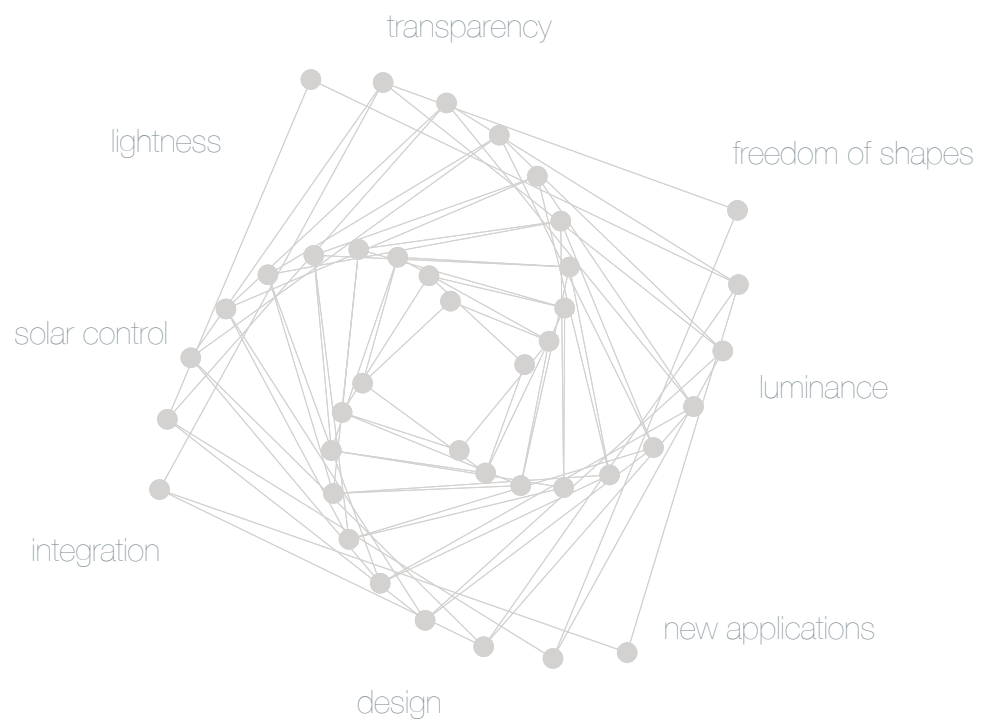


# ETFE, the transparent architecture



**IASO**

# IASO, integrated with creativity

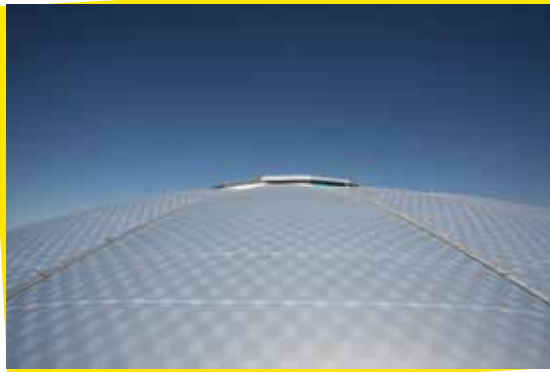


# ETFE, values to enhance your projects

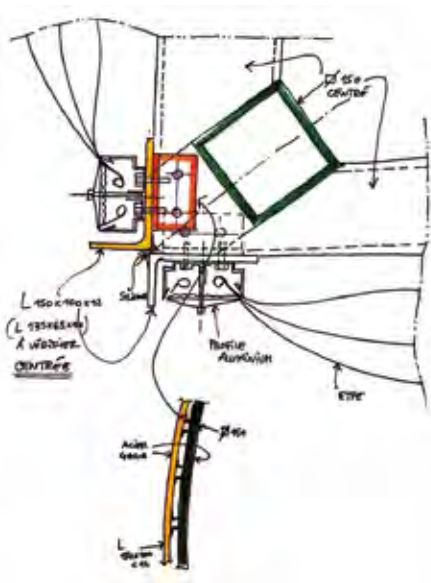
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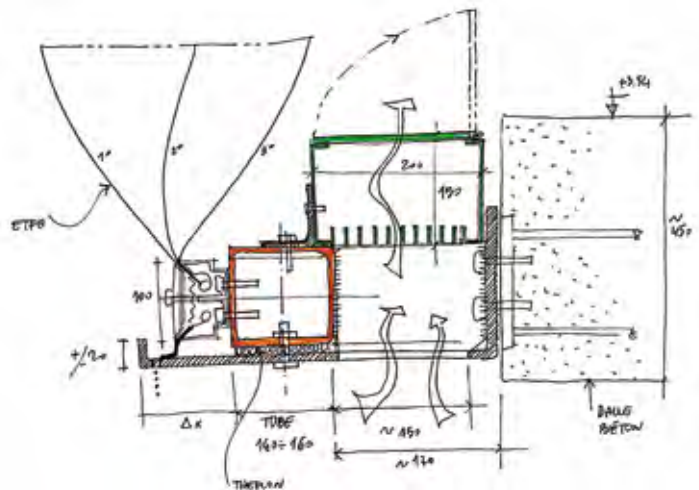
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# IASO



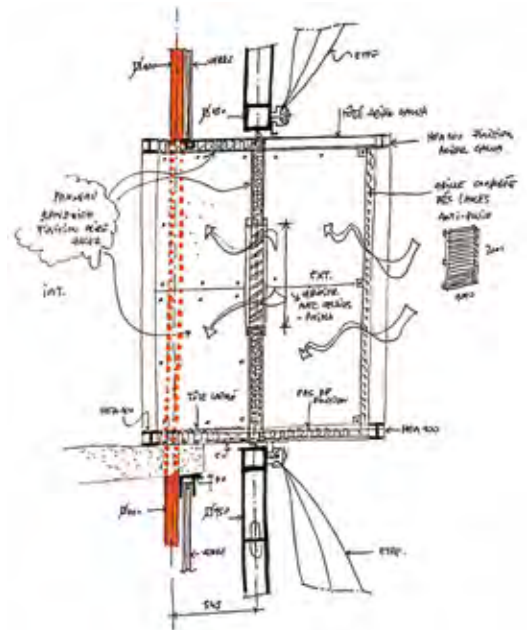
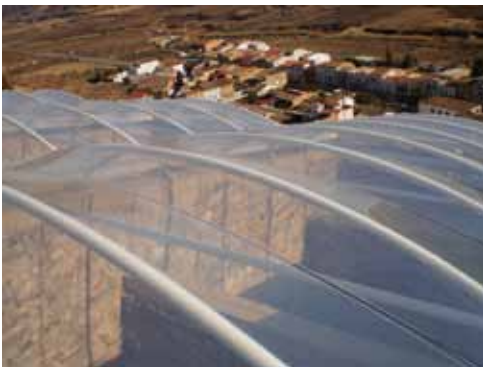
ETFE (ethylene tetrafluoroethylene) is one of the most innovative materials in contemporary architecture. Along with the IASO ETFE system, architects and designers plan the most valuable architectural spaces.





# comprehensive project

At IASO, we develop your project with the Comprehensive Project methodology. IASO, a single partner that brings together engineering, manufacturing, and installation, ensures the project's success. The benefits of our work system are perceived in each of our works.



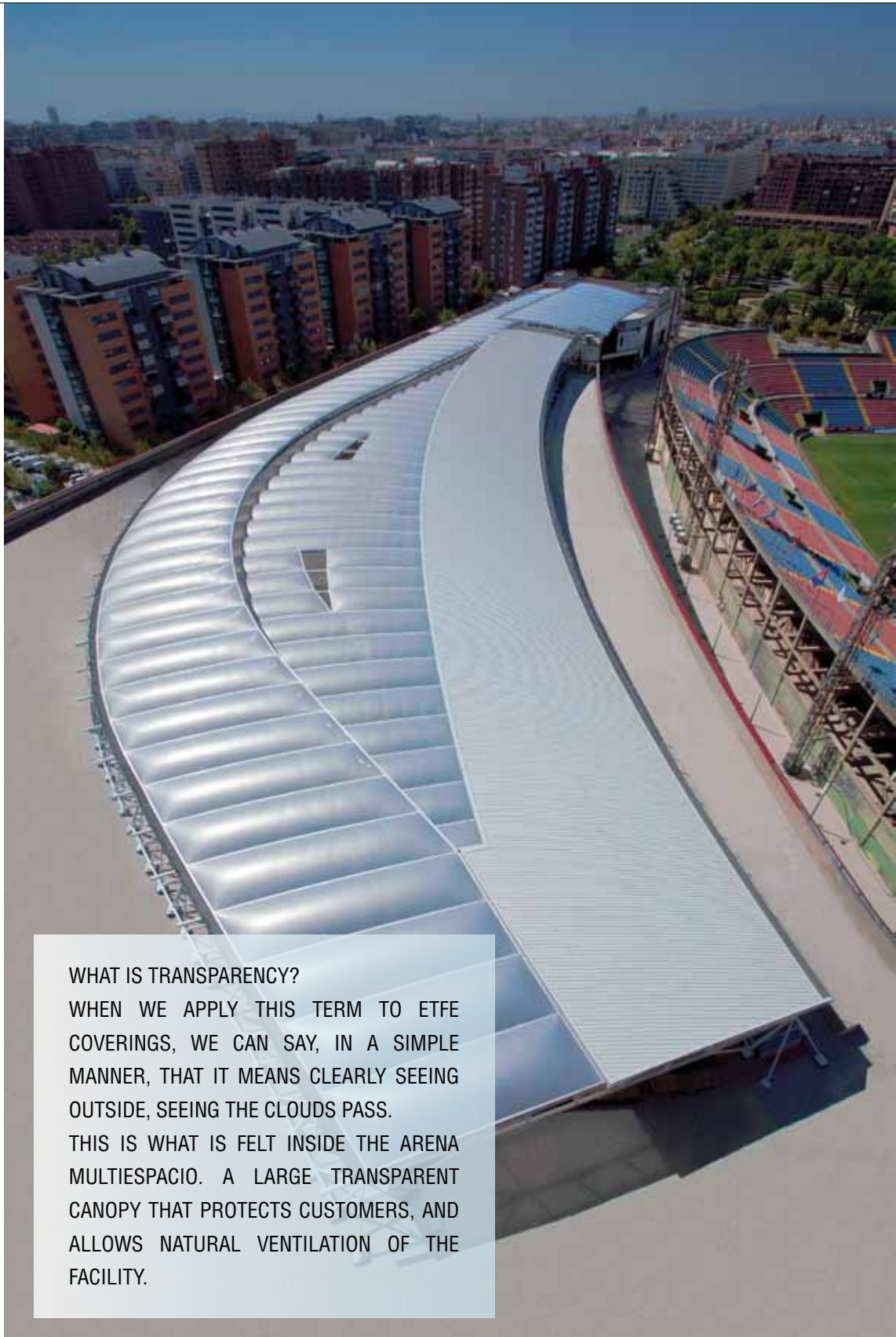
We value the uniqueness of each project, no matter the size. We believe that architectural value is above the magnitude of the building. Discover the attributes of transparent architecture through the works executed by IASO.

Your project is our challenge!





# TRANSPARENCY



WHAT IS TRANSPARENCY?

WHEN WE APPLY THIS TERM TO ETFE COVERINGS, WE CAN SAY, IN A SIMPLE MANNER, THAT IT MEANS CLEARLY SEEING OUTSIDE, SEEING THE CLOUDS PASS.

THIS IS WHAT IS FELT INSIDE THE ARENA MULTIESPACIO. A LARGE TRANSPARENT CANOPY THAT PROTECTS CUSTOMERS, AND ALLOWS NATURAL VENTILATION OF THE FACILITY.

## ARENA Multi-space comercial centre

**Project:** ARENA Multi-space commercial centre

**Location:** Valencia Spain

**Architect:** Chapman Taylor

**Area:** 6,000 m<sup>2</sup>

**System:** ETFE double-layer cushions of 250 microns / 250 microns transparent



Three-tier structure.  
Allows natural ventilation  
inside and smoke evacuation  
in case of fire.



The Arena Multi-space Commercial Centre brings together nearly a hundred shops dedicated to fashion. Chapman Taylor requested a large canopy of 6,000 m<sup>2</sup> to protect and

convey an open-air experience. Our challenge: optimizing weather conditions, enhancing and promoting business activity, by means of an ETFE transparent covering.





# TRANSPARENCY





## AQUALIBI water park

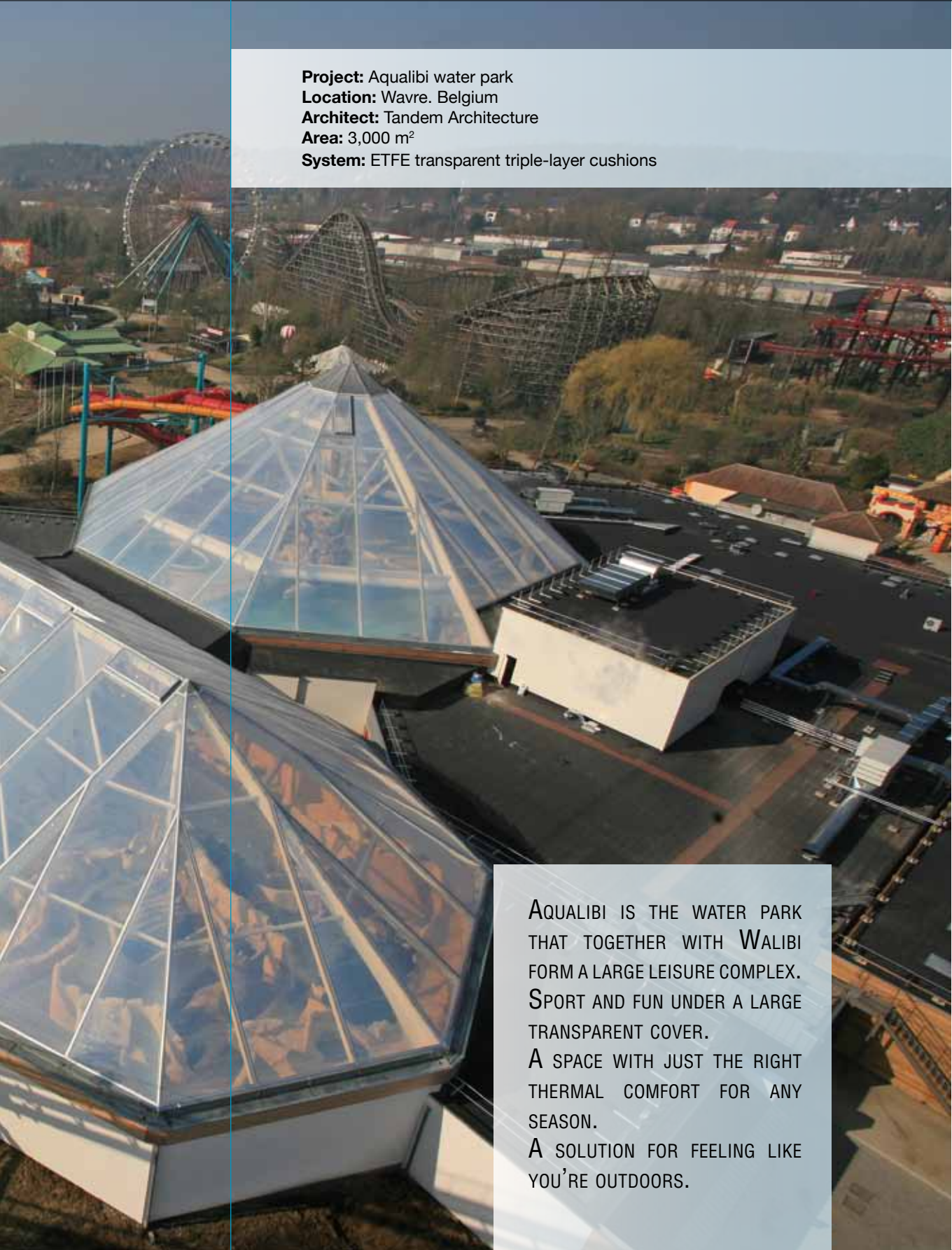
**Project:** Aqualibi water park

**Location:** Wavre, Belgium

**Architect:** Tandem Architecture

**Area:** 3,000 m<sup>2</sup>

**System:** ETFE transparent triple-layer cushions



AQUALIBI IS THE WATER PARK THAT TOGETHER WITH WALIBI FORM A LARGE LEISURE COMPLEX. SPORT AND FUN UNDER A LARGE TRANSPARENT COVER. A SPACE WITH JUST THE RIGHT THERMAL COMFORT FOR ANY SEASON. A SOLUTION FOR FEELING LIKE YOU'RE OUTDOORS.

# TRANSPARENCY





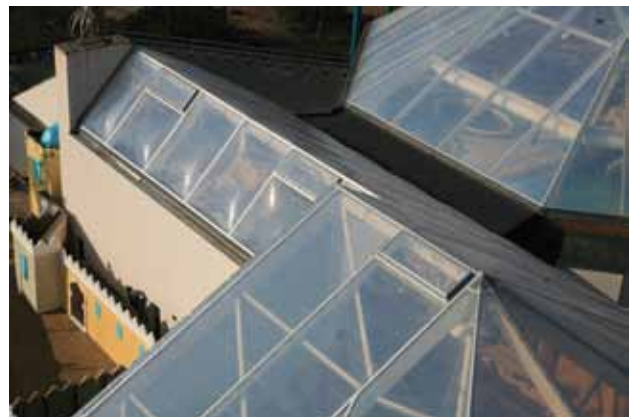
## AQUALIBI water park



Feels like you are outdoors thanks to the transparency of the ETFE layers.

The alternations at the water park included new ETFE covering that covers an area of 3,000 m<sup>2</sup>. The profile and triple-layer cushions system are attached to the glulam beams. The large octagonal pyramid has a diameter of 48 m.

The rapid area, with an elongated ground plan, terminates at its end with a polygonal apse. ETFE sheets have excellent durability and stay transparent over a long time.





# TRANSPARENCY





## Allianz Riviera Stadium

**Project:** Exterior and inner ring of the Allianz Riviera Stadium

**Location:** Nice, France

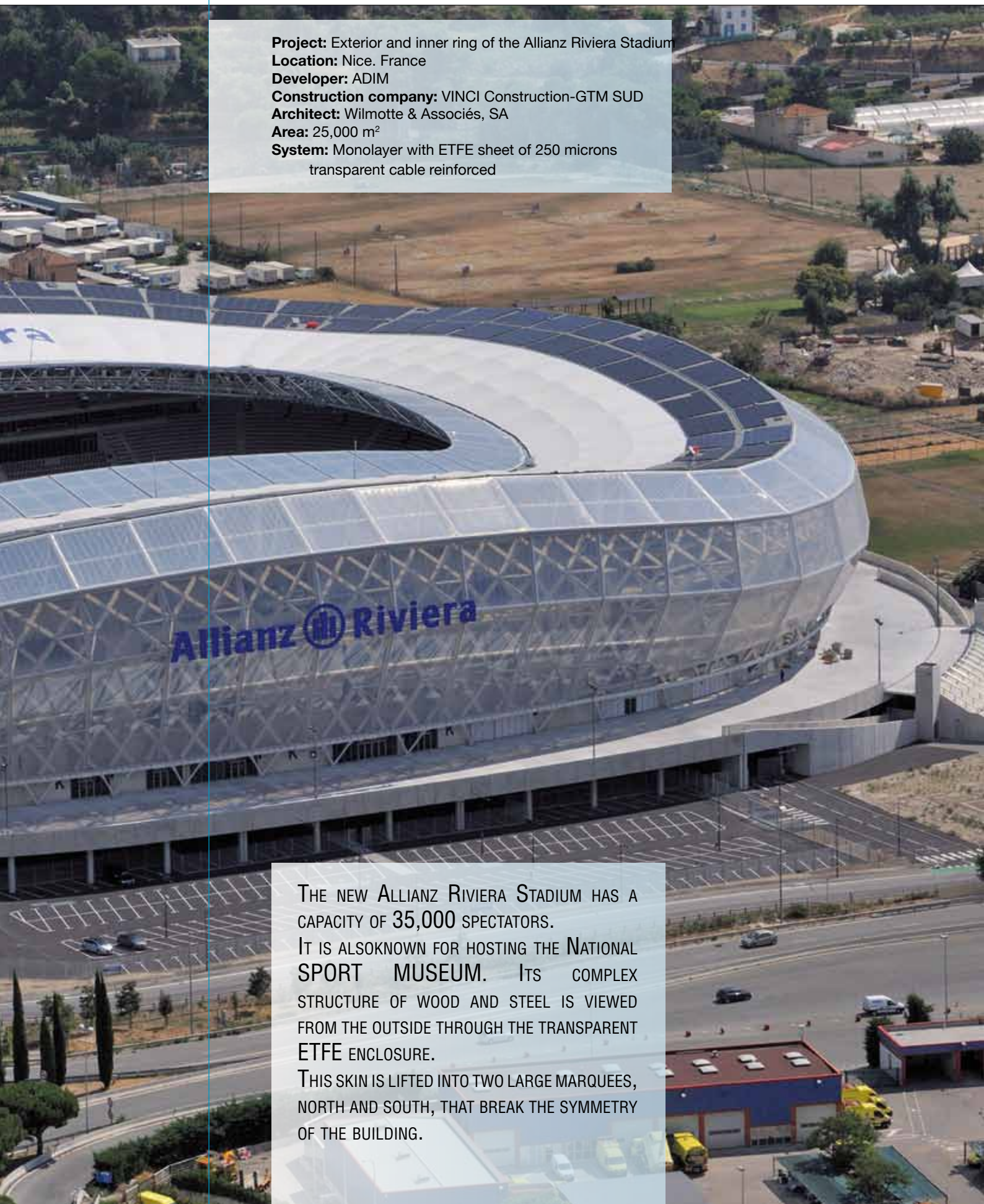
**Developer:** ADIM

**Construction company:** VINCI Construction-GTM SUD

**Architect:** Wilmotte & Associés, SA

**Area:** 25,000 m<sup>2</sup>

**System:** Monolayer with ETFE sheet of 250 microns  
transparent cable reinforced



THE NEW ALLIANZ RIVIERA STADIUM HAS A CAPACITY OF 35,000 SPECTATORS.

IT IS ALSO KNOWN FOR HOSTING THE NATIONAL SPORT MUSEUM. ITS COMPLEX STRUCTURE OF WOOD AND STEEL IS VIEWED FROM THE OUTSIDE THROUGH THE TRANSPARENT ETFE ENCLOSURE.

THIS SKIN IS LIFTED INTO TWO LARGE MARQUEES, NORTH AND SOUTH, THAT BREAK THE SYMMETRY OF THE BUILDING.



# TRANSPARENCY



*Innovative facade and inner ring constructed with ETFE sheets.*





## Allianz Riviera Stadium

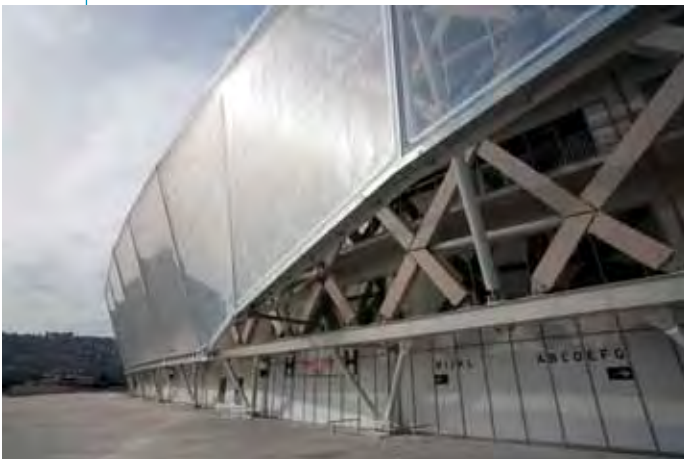


The ETFE enclosure rises in the north and south, creating two large canopies that give the whole building a more dynamic look. Its translucent silhouette fills the entire space with natural light.

The inner ring of the covering is combined with the ETFE facade, constructed with the same material, which provides protection for the stands and more sunlight for the playing field.



The spectacular Allianz Riviera is now another icon in the city of Nice. The new stadium hosts sports and cultural events.



# FREEDOM OF SHAPES



ISLAZUL WAS THE FIRST COMMERCIAL CENTRE IN SPAIN TO INCORPORATE A TRANSPARENT ETFE COVERING. THE MORE THAN 100 DOUBLE-LAYER CUSHIONS THAT COVER THE SKYLIGHT OF THE BUILDING GIVE SHAPE TO A UNIQUE AND SINGULAR STRUCTURE.



## ISLAZUL commercial centre

**Project:** Covering for the *Malls* and Plaza Caraba of C.C. Islazul

**Location:** Madrid. Spain

**Developer:** Grupo Lar

**Architect:** L35 Arquitectos

**Project management:** Bovis Lend Lease

**Area:** 9,500 m<sup>2</sup>

**System:** ETFE double-layer cushions of 250 microns printed / 250 microns transparent





# FREEDOM OF SHAPES



Plaza Caraba is noted for its elliptical shape and its dimensions of 80 m long by 54 m wide. The other large skylight is in the shopping mall, where the cushions range from 12 m to 30 m long, with a separation between modules of about 4.4 m.





## ISLAZUL commercial centre



Light transmission and solar radiation are reduced by printing on the outer sheet. In addition, interior elements are incorporated in some areas of the building to improve sun protection.

The covering is notable for its transparency and the lightness of the metallic frame.



# FREEDOM OF SHAPES



BILBAO IS A PIONEERING CITY IN ICONIC ARCHITECTURE. THE NEW STADIUM OF SAN MAMÉS CAN BE ADDED TO THESE BUILDINGS THAT STAND OUT DUE TO THEIR SINGULAR BEAUTY. ITS FAÇADE IS COMPOSED OF MORE THAN 2,700 SLATS, WHICH ALL CREATE AN ENCLOSURE THAT CHANGES ITS VISUAL APPEARANCE AS YOU WALK AROUND ITS PERIMETER. ONLY ONE SINGLE EFFECT IS ACHIEVED WITH A SINGLE TYPE OF GEOMETRY AND HIGHLY DEVELOPED ENGINEERING.



## SAN MAMÉS new stadium

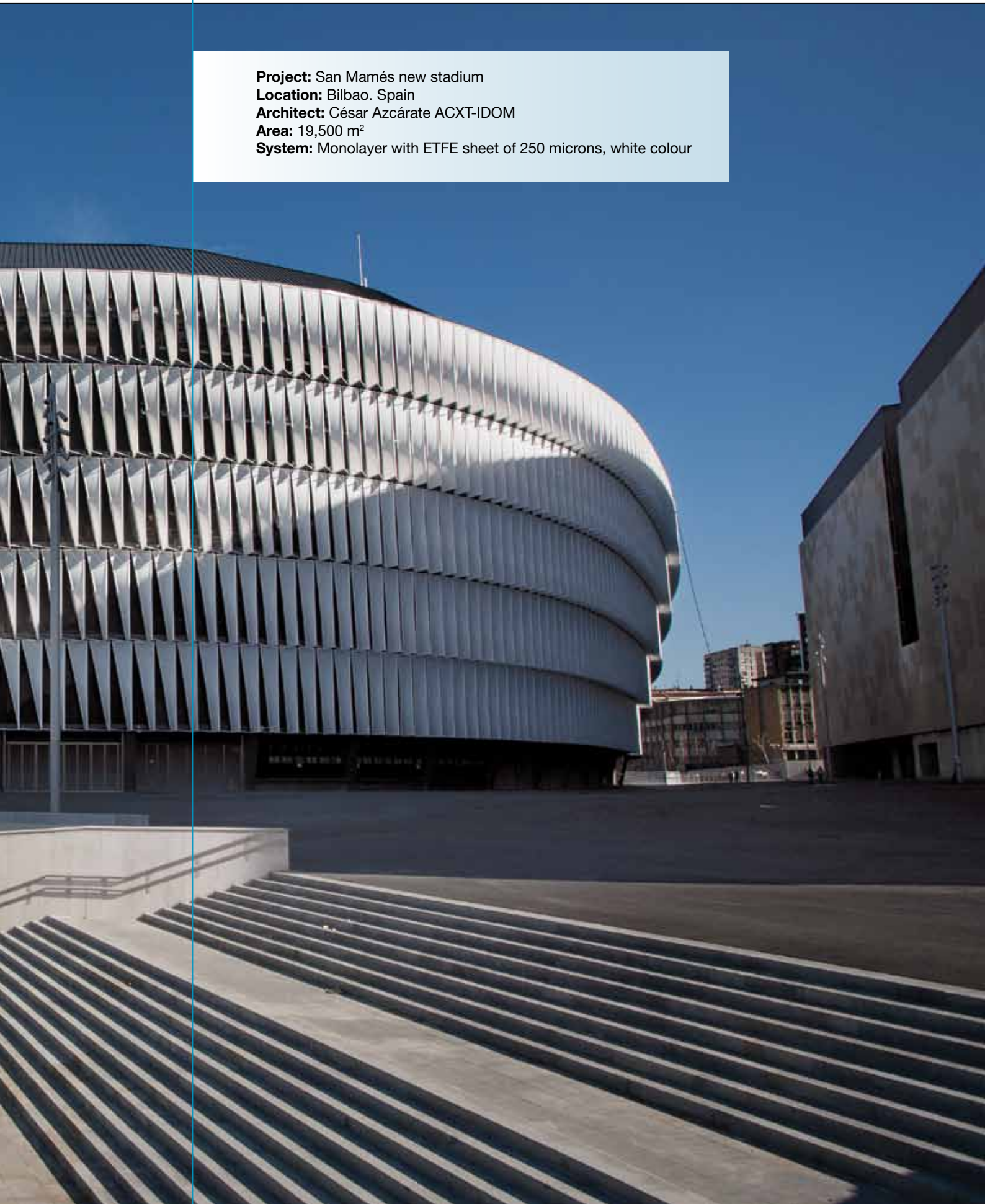
**Project:** San Mamés new stadium

**Location:** Bilbao. Spain

**Architect:** César Azcárate ACXT-IDOM

**Area:** 19,500 m<sup>2</sup>

**System:** Monolayer with ETFE sheet of 250 microns, white colour



# FREEDOM OF SHAPES



From its different perspectives, we can observe a building with dynamism, which is achieved through the slats of 5.40 m by 1.20 m, with double curvature geometry.

The construction of the new San Mamés stadium was planned in two phases. The facade has over 2,700 slats that are all identical and distributed in five levels. Each piece consists of a metal frame built with a circular cross-section profile. IASO has developed a hidden fastening system, which is integrated inside the profile. The white sheet is perfectly tensioned.

The result is a unique facade; permeable to vision that allows natural ventilation of the building.





## SAN MAMÉS new stadium



# LIGHTNESS

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THE NEW SUPERIOR SCHOOL OF HEALTH FORMS PART OF THE UNIVERSITY OF AVEIRO. THE COMPLEX CONSISTS OF TWO PAVILIONS ALIGNED AND CONNECTED BY TWO BRIDGES. THE CONSTRUCTION USED IN THE BUILDINGS CONTRASTS WITH THE LIGHTNESS OF THE TWO CONNECTING BRIDGES AND OPENINGS IN THE FACADE CONSTRUCTED WITH ETFE SHEETS.



## University of AVEIRO

**Project:** Superior School of Health.  
University of Aveiro.

**Location:** Aveiro. Portugal

**Architect:** AT.93

**Developer:** MRG

**Area:** 1,345 m<sup>2</sup>

**System:** In the buildings: double-layer of ETFE sheets of 250 microns printed / 250 microns transparent. Footbridges: monolayer sheet of transparent ETFE of 250 microns



Between the interior facades two ETFE clad foot bridges are supported with a length of over 18 meters and a height of 8.5 m. The transparent enclosure allows natural ventilation through the elliptical top vents.

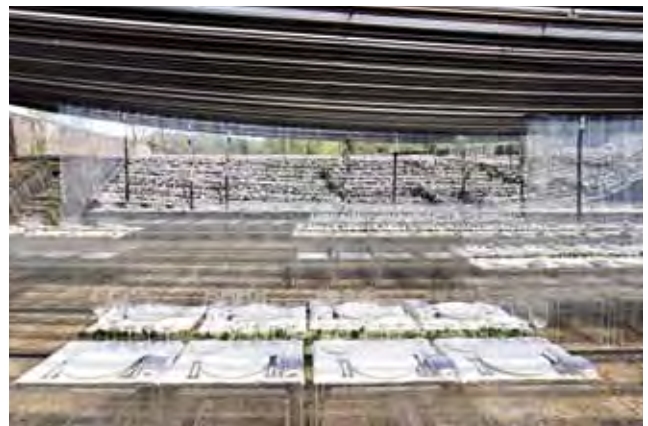
On the facade of one of the buildings, its openings are closed by a double layer reinforced by cables, which achieves a good thermal insulation and a great passage of natural light.



# LIGHTNESS



ENJOYING A BIG EVENT IN A FIELD PROTECTED BY A SCREEN COVERING WAS THE ARCHITECT'S VISION FOR CREATING THIS SPACE. THE RESULT, A COVERING OF TRANSPARENT AND LIGHTWEIGHT ETFE, WITH A PARTICULAR METAL SUPPORT STRUCTURE, ALL IN A UNIQUE SETTING.





## LES COLS restaurant

**Project:** Pavilion for banquettes in the Les Cols restaurant  
**Location:** Olot, Spain  
**Architect:** RCR Arquitectes  
**Area:** 800 m<sup>2</sup>  
**System:** ETFE double-layer sheet of 250 microns printed / 250 microns transparent

The metal frame is suspended by its ends leaving an open space of more than 28 m.



The new pavilion is below the level of the natural elevation of the ground. Large walls support the structure of circular tubes, arranged in parallel. The ETFE transparent covering is comprised of prestressed double-layers that provide good

thermal insulation. A place with a special atmosphere, thanks to the combination of shadows, light and trees that emerge above the ETFE covering. An innovative, comfortable, and elegant place.



# LUMINANCE



A DOME IS THE STAR OF THE NEW PLAZA DEL MILENIO. DURING THE DAY, ITS SPHERICAL SHAPE FILLS WITH INTERIOR DAYLIGHT AND AT NIGHT IT BECOMES A LARGE LAMP THAT OFFERS THE POSSIBILITY OF DIFFERENT COLOR EFFECTS. SINGULAR CONSTRUCTION DESIGNED AS A MULTIFUNCTIONAL SPACE.





## Plaza MILENIO dome

**Project:** Dome of the Plaza Milenio

**Location:** Valladolid. Spain

**Architect:** Enric Ruiz-Geli CLOUD9

**Area:** 2,200 m<sup>2</sup>

**System:** Triple-layer cushions



The printed layer of the cushion reduces solar radiation inside the dome.

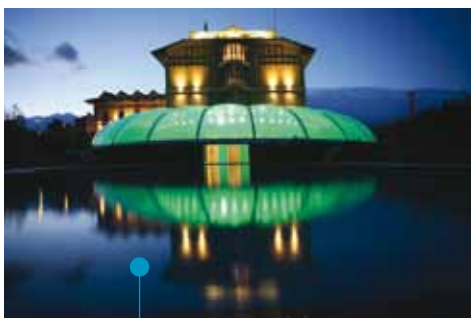
The lighting system creates different atmospheres.



The dome is made of a metallic structure in the form of a spherical cap, 45 m in diameter, composed of polygons of different sizes. On this structure, over 84 triple-layer slats are placed. With two layers printed and one white. The transition from the covering to the pavement combines from a vertical garden that is interrupted with the entrance doors to the building.

# LUMINANCE

THE VILLA DE LAGUARDIA HOTEL EXTENDED ITS ACTIVITIES TO A NEW AREA FOR SPA AND WELLNESS. THE WATER AREA IS CHARACTERIZED BY ITS ETFE TRANSPARENT COVERING. LUMINOSITY AND THE FEELING OF BEING OUTDOORS ARE THE MOST IMPORTANT QUALITIES OF THIS NEW SPACE.



• Covering for the spa & wellness area



• ETFE cushions allow climate control inside the new zone.

The new space at the Villa de Laguardia Hotel, in Álava, is defined as a zone of comfort and tranquillity for its customers. The modern materials mix with the classical elegance of the hotel. The LEDs create dynamism and luminosity in the space.



## VILLA de LAGUARDIA Hotel

**Project:** Villa de Laguardia Hotel

**Location:** Laguardia. Spain

**Architect:** Felipe Sáez de Gordo, SGA

**Area:** 500 m<sup>2</sup>

**System:** ETFE triple-layer cushions of 250 microns printed / 250 microns transparent

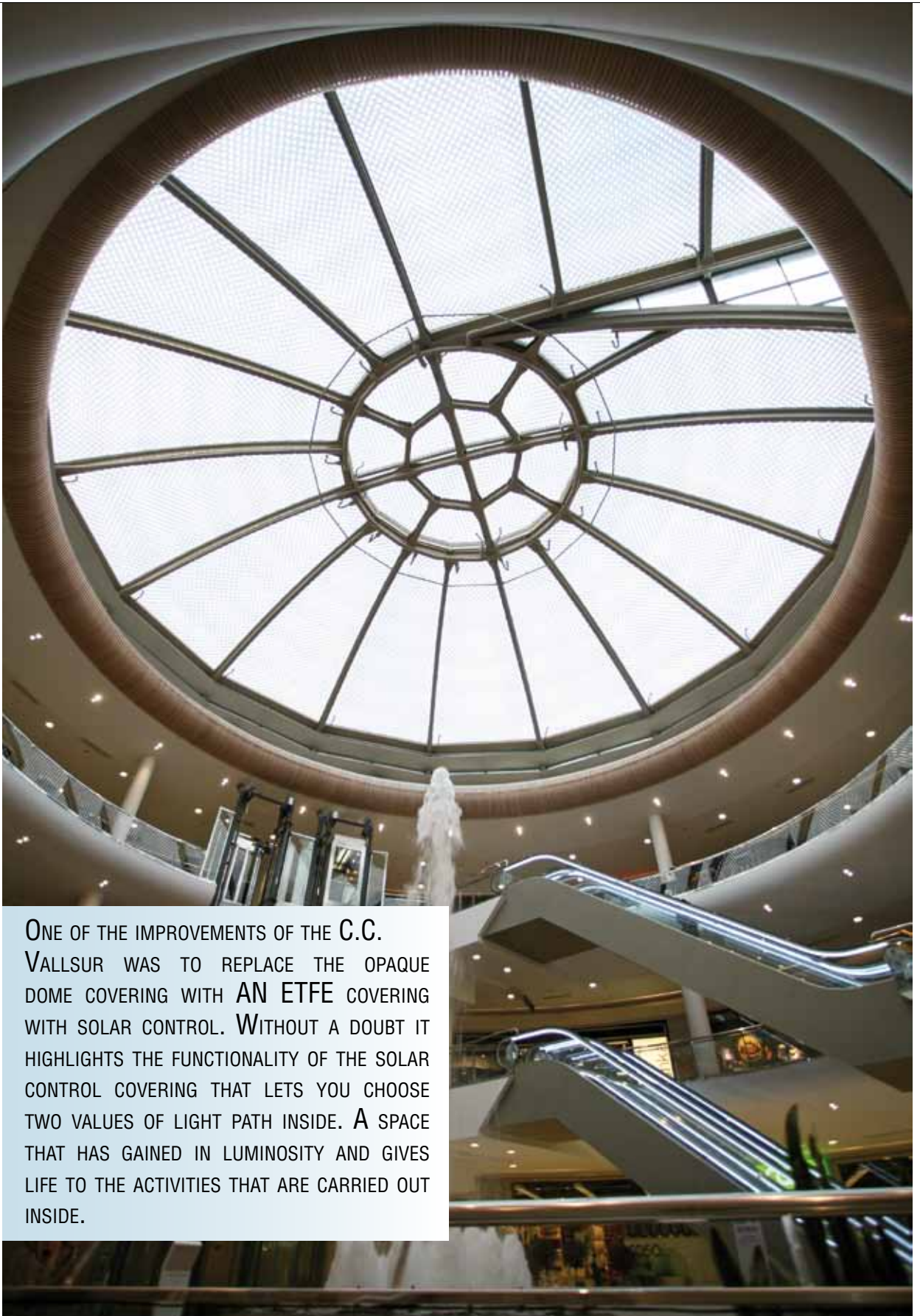
Mix of styles. Contrast with the modernity of the materials and the classicism of the hotel.



The ETFE material used for the semicircular covering blends the entry of light and solar radiation, by printing one of its layers. Its geometry shaped arches, which rise from the

upper terrace and are supported in the garden, contribute an interior volume that together with its great transparency to the outside environment, spread the rest and relaxation pursued by the clients.

# SOLAR CONTROL



ONE OF THE IMPROVEMENTS OF THE C.C. VALLSUR WAS TO REPLACE THE OPAQUE DOME COVERING WITH AN ETFE COVERING WITH SOLAR CONTROL. WITHOUT A DOUBT IT HIGHLIGHTS THE FUNCTIONALITY OF THE SOLAR CONTROL COVERING THAT LETS YOU CHOOSE TWO VALUES OF LIGHT PATH INSIDE. A SPACE THAT HAS GAINED IN LUMINOSITY AND GIVES LIFE TO THE ACTIVITIES THAT ARE CARRIED OUT INSIDE.



## VALLSUR commercial centre

**Project:** Vallsur commercial centre

**Location:** Valladolid. Spain

**Developer:** Unibail-Rodamco

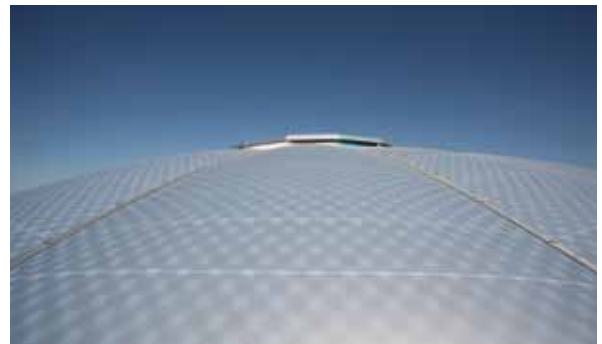
**Architect:** Inel 2000

**Area:** 490 m<sup>2</sup>

**System:** ETFE cushions with triple-layer solar control

The upper and intermediate sheets are printed with designs that overlap.

The solar control system moves the intermediate layer up or down, changing the passage of light and solar radiation into the building.



Solar control system machinery





# INTEGRATION

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## Sant Pere de Corbera d'Ebre CHURCH

**Project:** Covering for the old Sant Pere Church  
**Location:** Corbera d'Ebre. Spain  
**Developer:** Becsa  
**Architect:** Ferran Vizoso - Núria Bordas  
**Area:** 700 m<sup>2</sup>  
**System:** Monolayer with ETFE sheet of 250 microns transparent

THE OLD CHURCH WAS DESTROYED DURING THE SPANISH CIVIL WAR.

THIS LANDMARK BUILDING RESTORED IN VARIOUS PHASES NOW HAS AN ETFE TRANSPARENT COVERING. THE SEAMLESS INTEGRATION OF THIS ELEMENT RESPECTS ITS HISTORIC CHARACTER AND GAINS A MULTIFUNCTIONAL SPACE.

# INTEGRATION



The transparency of the ETFE sheets makes the new covering visually disappear and it continues highlighting the building.



Two systems of opposite construction; the strength of the existing building in contrast to the lightness of the new covering.  
The memory of this important historic monument has been preserved.





## Sant Pere de Corbera d'Ebre CHURCH



The lightweight metal frame follows the modulation of the building. Its four modules wide, between 7 m and 9.60 m, have arches distributed parallel every 1.60 m





# INTEGRATION





## Luxembourg STATION



THE LUXEMBOURG CENTRAL TRAIN STATION WAS BUILT IN THE EARLY 20TH CENTURY.

THE CURRENT ALTERATIONS HAVE EXPANDED THE LOBBY, RENEWED THE PEDESTRIAN MARQUEE AND BICYCLE PARKING.

THE HALL STANDS OUT FOR THE DESIGN AND DETAILS OF THE METAL STRUCTURE. THE ETFE COVERINGS ARE NATURALLY INTEGRATED INTO THE NEO-BAROQUE ARCHITECTURE OF THIS BUILDING.

# INTEGRATION



The new structure conveys a visual lightness of great beauty, created by means of a diamond-shaped geometry. This element was also used as the basis of a special design printed on the ETFE sheet. The pedestrian marquee, as an inverted roof gable has a length of 117 m and a width of 8 m.



## Luxembourg Central Station

**Project:** Passenger and pedestrian marquee of the Luxembourg Central Station

**Location:** Luxembourg

**Architect:** AREP

**Area:** 2,400 m<sup>2</sup>

**System:** Monolayer sheet of transparent ETFE of 250 microns and printed with a special design

The hall marquee creates a unique and naturally integrated space at the station. The cover, with a length of 65 m, is divided into 160 pieces of ETFE. Each membrane is reinforced with cables arranged parallel each 85 cm. The printing of the sheet has different opacities that blend the natural light. The new space was designed with a dynamic structure, steel support and an ETFE covering.



# DESIGN



IN THE COMMERCIAL CENTRE OF LECLERC EN LES PORTES DU VALAIS, THREE SKYLIGHTS WERE BUILT AS WELL AS THREE COVERINGS TO ACCESS THE BUILDING. OUTDOOR, A MONOLAYER ETFE COVERINGS AND INSIDE, ETFE CUSHION SKYLIGHTS ARE LIGHT SOURCES THAT GIVE RICHNESS TO THE INTERIOR DECORATION OF THE COMMERCIAL CENTRE.





## LECLERC Commercial Centre

**Project:** Leclerc Les Portes du Valois commercial centre

**Location:** Le Plessis Belleville. France

**Area:** 540 m<sup>2</sup>

**System:** In the building: ETFE triple-layer cushions of 250 microns printed / 100 microns / 250 microns transparent.  
In the accesses: monolayer with ETFE sheet of 250 microns transparent

The roof of the building opens to allow natural light and enhance the interiors.

In the accesses of the building, the transparent domes are constructed with an ETFE single-layer sheet system. By day, natural light floods the interior space, at night it lights up and turns into a large lamp visible from the parking area.



# DESIGN

## EL TIRO commercial centre

**Project:** El Tiro Commercial Centre

**Location:** Murcia, Spain

**Architect:** Alemán Arquitectos

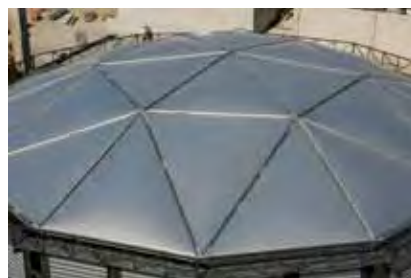
**Area:** 524 m<sup>2</sup>

**System:** ETFE double-sheet cushions of 250 µm printed / 250 µm printed



In the great square where the two main axes of the commercial space converge the dome of more than 25 m diameter appears. The spectacular geometry of the metal structure decomposes the skylight in 24 triangular cushions.

The double-sheet printed cushions protect from solar radiation, while having a very high visible light pass through.





# NEW APPLICATION

## Urban Space Station

**Project:** Urban Space Station

**Location:** Centro de arte Museo Reina Sofía, Madrid. Spain

**Design and project:** Natalie Jerimejenko and Angel Borrego

**System:** ETFE sheet of 150 µm transparent



ETFE membranes suit all types of projects including new applications.

This device was designed to capture emissions of carbon dioxide from the atmosphere.

The new application served to see the potential of the new material. An idealistic and utopian concept that gives rise to a new technology where art enhances environmental conservation.



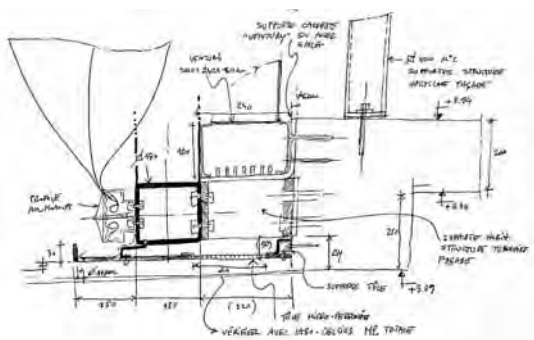
# The new transparent construction

## How is it applied?

### IASO monolayer system

One single ETFE sheet with double curvature geometry, which sometimes can also be contained in the plane. Generally, reinforced by cables in one direction or both.

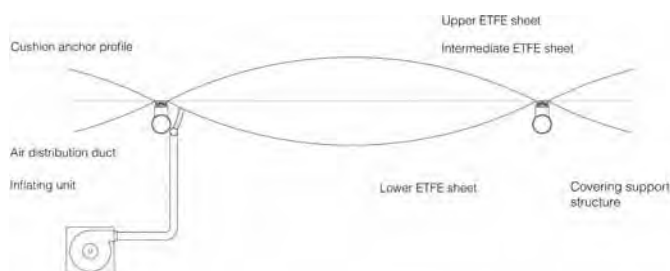
In monolayer applications, it is critical in the initial tension to introduce a prestressed sheet. Knowledge of the subject and a good calculation process will determine the appropriate prestressed settings so that the coverings will work properly over the years.



### IASO puffy cushion system

It is constructed with two or more closed ETFE laminates in its perimeter and supported with a perimeter anchorage system. Requires an air inflation system in low humidity and at low pressure (250 Pa), which is produced by a unit consisting of fans and air distribution ducts.


IASO solar control system cushions, which by movable intermediate layers and with an upper layer and printed intermediate to modify the passage of light and solar radiation.







## A large, curved, translucent structure, possibly a greenhouse or a large tent, with a grid-like pattern, set against a clear blue sky. The structure is made of a material that allows light to pass through while providing a protective barrier. The grid pattern is formed by the underlying framework or the way the material is laid out. The structure is curved, following the shape of the roof or the ground it covers. The sky is a solid, clear blue, indicating a bright, sunny day. The overall scene suggests a large-scale agricultural or industrial project.



The cushions are set at the perimeter contour through a system of extruded aluminium profiles. The air tightness of the system is ensured by rubber gaskets.

## Technical features



ETFE is a strong, durable, and transparent fluoropolymer. It constitutes an alternative to conventional materials endorsed by applications that have been in existence for more than 25 years.

ETFE is a lightweight material about 175 g/m<sup>2</sup> for a sheet of 100 microns, that is highly durable, which offers a wide range of possibilities in its shape and geometry for designing innovative and spectacular buildings.

The lightness of the laminates and the fastening system result in lower consumption in support structures and a considerable economic savings, even more so in structures with many lights and elevated areas.



A product with many economical advantages that amazes due to many technical characteristics:

- Reduced weight
- It can be coloured, printed, and illuminated
- Highly transparent (95% visible light / 85% ultraviolet light)
- Excellent reaction to fire (B-s1,d0, according to EN13501- 1:2007)
- Impermeable
- Self-cleaning with rain water
- Permeable to UVA rays, impedes UVC rays from entering
- Minimum maintenance
- Very resistant to exteriors
- Recyclable
- Good resistance to impact (hail, etc.)
- Does not have visible mechanical deterioration
- Does not discolour or harden

Applications:

Zoological / Large dimension coverings – Commercial centres, offices, sport stadiums / skylights / convention centres...





1 250µm Transparent Sheet

Density: 1.75 g/cm<sup>3</sup> (DIN 53479)  
Sheet weight: 437 g/m<sup>2</sup>  
Ultimate tensile strength >40 N/mm<sup>2</sup>  
(DIN EN ISO 527-1)  
Elongation at break:> 300%  
(DIN EN ISO 527-1)  
Melting point: 270°C (DSC 16° K/min)  
Visible light transmission> 90%  
Fire rating: B-s1,d0  
(EN 13501-1:2007)

2 250 µm print sheet (4.2/65/28)

Sheet thickness: 250 µm  
Colour: silver  
Point diameter: 4.2 mm  
Printed surface: 65%  
Visible light colour transmission: 28%  
Total visible light transmission: 50%

3 250 micron printed sheet ref.16/70/16

Sheet thickness: 250 µm  
Colour: silver  
Point diameter: 16 mm  
Printed surface: 70%  
Visible light colour transmission: 16%  
Total visible light transmission: 39%

4 250 micron white sheet

Sheet thickness: 250 µm  
Visible light transmission: 30%







*Comprehensive project*



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