

## COMPANY

**Fluidra**

## LOCATION

**Barcelona, Spain**

## SOFTWARE

**Autodesk® AutoCAD®****Autodesk® Revit®****Autodesk® Inventor®****Autodesk® Robot™ Structural Analysis****Professional****Autodesk® Live****Dynamo****Autodesk® Navisworks®****Autodesk® CFD Ultimate**

# An aquatic show, unique in the world, created with BIM

Fluidra designs and builds in record time a floating platform for water and light effects

**Fluidra** is a multinational group leader in the swimming pool and wellness sector, with 50 years of history. They manufacture and distribute all the components for **construction, renovation, improvement and maintenance of swimming pools, ornamental fountains, aquariums and lagoons.** They have over 135 branches, 30 production sites, more than 5,500 employees and operate in over 45 countries. Their motto: ***“We create the perfect pool and wellness experience.”***

Fluidra's commitment to **innovation and excellence** makes them a **benchmark in the implementation of BIM methodology.** Their first BIM project was Likids de Caldea (Andorra, 2015), the first children's wellness centre in the world. Among their most outstanding projects are the **first temporary floating pool at the World Water Sports Championships in Barcelona (2003) -engineering award for the best building-**, as well as the pools at its editions in Shanghai (2006), Melbourne (2007) or Manchester (2008).



Image courtesy of Fluidra

To celebrate their **50th anniversary**, Fluidra created an **unprecedented artistic show, which brought together water, light and synchronised swimming.** The show, which attracted **more than 4,500 spectators** in Barcelona, was held on a **floating platform, designed and built with BIM.** Without this methodology, the project would have been unfeasible, as it was completed in a **record time**, in five months. **Autodesk Revit and Autodesk Inventor** were two key softwares in the *workflow*: improved **communication** between the parties (more than 25 companies involved), facilitated **decision-making** and **halved costs and waste.**

## **Challenge:** **design and construction in record time**

The music, choreography, a magical water screen and the play of lights and jets on the floating platform made Fluidra's 50th anniversary celebration spectacular. An unprecedented show, which tells the story of the brand. ***“We have put technology at the service on the art”***, explains Xavier Vila, Technical Director of the Technical Office.

***“Our platform is much more than a fountain, where you have a diversity of effects and the interaction of the swimmers; it is a unique show because the platform is unique in the world,”*** he adds. A total of **4,500 people** attended the 5 presentations of the show in the pool of the **Club Natació Atlètic Barceloneta** (Barcelona, October 2019).

# Revit and Inventor allowed to reducing costs by 60%, savings on prototypes and obtaining maximum traceability

But behind the art, there was technique and innovation. **A project that could happen thanks to the fact that it was executed 100% with BIM methodology, since time was the great challenge. They had less than five months** for concept, design, manufacturing, testing and assembly, both technically and artistically. **“To guarantee traceability throughout the project, we managed to converge different solutions and parts of the project in a single file, this allowed us to coordinate with all the actors involved from the initial phase, design, manufacture and construction and assembly”**, explains Gerard Lladós, Architecture Manager of the project. **“Without BIM it would not have been possible to achieve this in the short time available to us”**, added Gerard Lladós, who is also BIM Director of Fluidra Engineering Services.

They achieved this by building a **modular platform that is easy to assemble and transport, designed with Autodesk Inventor**, to overcome the **second problem**: to make possible the simultaneity of the **daytime activity of the Club Natació Atlètic Barceloneta** with the assembly and disassembly of the platform. On the one hand the **work was done at night** and on the other hand they had to design a lower platform with a pneumatic motor to keep the structure **submerged during the day**. For this

reason the **calculation of material densities** was essential, both to guarantee the buoyancy of the platform taking into account the weight of the dancers, and for the sinking necessary during the day for the usage of the swimming pool by club members.

## A light and water platform designed with BIM

Fluidra designed a **carbon steel platform** equipped with **water and light effects**, a **48m<sup>2</sup>** non-slip surface, weighing 4,000 Kg, with 118 water pumps and 208 LED lights. **“Autodesk Inventor allowed us to design and calculate the steel lattice of the structure for later manufacturing. Thanks to this, we managed to design a platform with a flat surface so that the dancers could move freely”**, explains Gerard Lladós.

The water jets were connected by pipes to a pumping group located outside, a closed-circuit designed **not to waste even a drop of water**. These pipes were modeled and coordinated with **Autodesk Revit** software, which allowed to **obtain 3D views and to extract the bill of materials** from the database of the modeled elements, so that the purchasing and logistics department could order the necessary materials for the construction.

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— Gerard Lladós  
Director, Dept. of Architecture,  
BIM and Technical Office  
Management

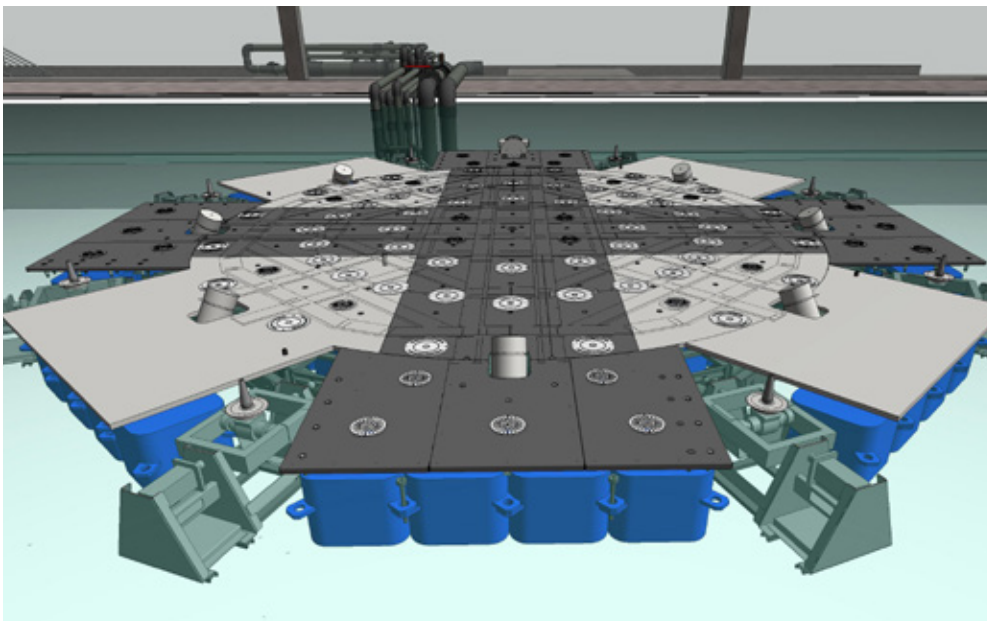


Image courtesy of Fluidra

# With BIM 50% less waste is generated in all phases of the project, from design to construction

*“The modeling in Revit and Inventor facilitated the understanding of the project by the different stakeholders and improved decision-making,”* explains Gerard Lladós. *“In addition to saving costs through automation and the use of existing virtual 3D CAD models”.*

In the design phase, **Dynamo** was used to automate the numbering and labeling of drawings, eliminating manual processes and speeding up mechanical work. In addition, it was used together with **Autodesk Revit** to generate **the technical documentation necessary to submit to the public administration from the BIM model.**

Given the need to avoid any unforeseen events, Fluidra presented the project with the **Autodesk Live** software, which allowed it to show it in **Virtual Reality** to the risk prevention team, the Club Natació Atlètic Barceloneta and the company that legalized the work. Thanks to **Autodesk Live** they were able to dive, literally, into the pool and see every detail of the structure, as well as to identify possible risks, aspects of public accessibility, possible evacuation exits, among other aspects. *“Once again, BIM allowed the decision makers involved to put the project into context and have access to quality information,”* adds Lladós.

Another important challenge for Fluidra was to **share with suppliers all the information** they had created with **Inventor**. Thanks to the BIM methodology, Fluidra was able to create an **OpenBIM model in IFC format** that any agent could open regardless of the software used.

The assembly of the platform and the installation was carried out by Fluidra personnel, except for the submerged work. **Autodesk Navisworks** allowed the analysis and subsequent correction of conflicts during the hydraulic design phase, as well as the coordination of assembly during execution. *“Navisworks provided seamless navigation of the project and a global 3D view of the project,”* according to the BIM Manager. On the other hand, to be able to move the pieces of the platform, Fluidra manufactured a truss based on the structural checks done with **Autodesk Robot Structural Analysis Professional**.

Each presentation had a capacity of 900 people, distributed in already existing grandstands and additional others that were installed for the occasion. This **coordination and management of the audience** was carried out using **Revit's** schedules.

Finally, for the legalization of the project, the

*“We decided to use Autodesk software to coordinate and work collaboratively with the various companies in the Fluidra group.”*

— **Xavier Vila**  
Technical Office manager

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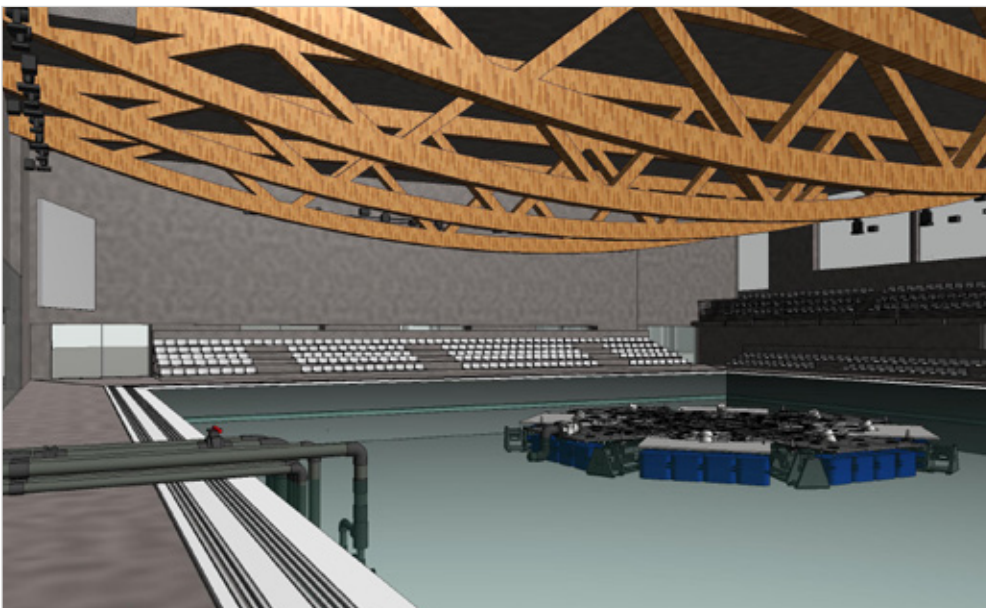


Image courtesy of Fluidra



# The BIM methodology was essential to provide agility and efficiency to the workflow and to show the project to the decision makers

Barcelona City Council requested a **study of noise pollution**. Fluidra used **CFD technology** with **Autodesk CFD Ultimate**, to simulate the **acoustic behaviour** and validate compliance with the municipal environmental regulations. **CFD Ultimate** allowed to create a computational mesh and a visualization of the sound field. Also, a **3D modeling** of the elements, both electromagnetic and urban, that could potentially intervene in the effects of emission, attenuation and reflection of sound waves was carried out. **Autodesk Inventor** was used for this purpose.

## 60% saving

The project was created according to **efficiency and sustainability criteria**. From the beginning, the materials were optimized as much as possible in order to have the minimum waste possible. Autodesk's software and the assistance of partner Asidek **streamlined the entire process** and made it possible to create a collaborative system with **Autodesk Revit** where **evacuation routes could be foreseen, steel could be optimized in the construction of structures and the design of facilities**. In addition, they were able to extract a **realistic bill of materials and get the maximum traceability throughout the project workflow**.

Furthermore, **the waste generated during all phases decreased by 50%** due to savings in prototypes and equipment not suitable

for the project's functionality, as well as the use of recyclable materials. **"Thanks to the BIM methodology we were able to save 60% in costs, as we did not make a prototype beforehand, since we had the virtual 3D model,"** explains Gerard Lladós, BIM Director. All modifications to the model for solving conflicts were made directly in the **virtual model**, thus significantly reducing material costs.

Fluidra's engineering team includes designers, engineers and architects who, in a BIM environment and using the latest technology available, conceived the project and offered the best solution embodied as a 3D model of the entire installation. As the BIM Director states, **"all the projects that Fluidra has carried out with Autodesk solutions have been a success in the design phase, generating documentation, virtual reality, conflict and coordination analysis, fluid simulation studies, etc."** Fluidra's long experience with BIM made it possible to carry out a project 100% with this methodology and in record time. The result: a spectacular event that left its mark on the audience that celebrated the 50th anniversary of the group.



Image courtesy of Fluidra