

history



# La Sagrada Familia Finally to Have its Capital CATIA V5 in the service of architecture

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*The machines reproduce the ellipsoidal movement of Gaudi's forms as introduced in the software, a pioneering technique the world over.*

The unfinished Sagrada Família temple, designed from 1883 onwards by Catalan architect Antoni Gaudi, is finally being completed with digital stone-machining solutions, such as CATIA V5, used to complete the temple's apse capital. The V5 PLM solution will accelerate and improve the overall completion of the Sagrada Família temple.

saving a great deal of time because we can now design a piece in ten minutes where six months were previously needed to design the same piece manually," emphasised Mr Burry.

### OUTSTANDING, INNOVATIVE TECHNOLOGY

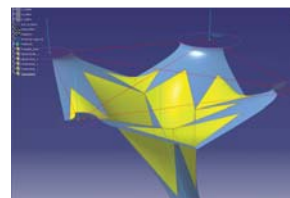
With CATIA V5, mechanics and architecture come together and make it possible to reproduce any shape in 3D and control the movement of the machining tools, particularly milling machines. The stone-drilling machines use digital design archives to generate the paths that programme their movement and enable successive cavities to be made in the capital. As Juan José Blasco, Director of Operations, T-Systems Iberia, explained: "It's a question of mathematics applied to numerical control to correct the movement limitations of the machining tools against the hardness of the type of granite used in this construction due to its crystallographic nature."

The machine reproduction of the tools' ellipsoidal movement is a pioneering technique that will give greater precision to the completion of the capital in the way Antoni Gaudi intended. This reworked capital will be complemented by another nine capitals, the apse

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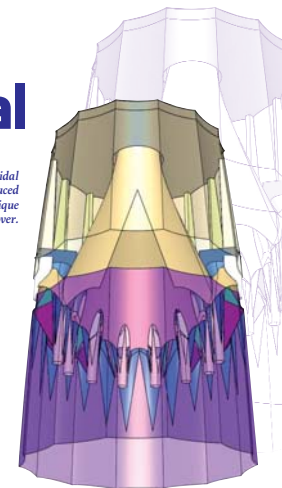
supporting the superior structure, and eighteen columns along the cathedral's Passion façade.

The sponsors of the project also emphasised that the application of this technology will speed up the preparation of the stone to create the capitals. The result is an extraordinary reduction in the time needed to complete the stonework.



### THE FUTURE

"There are still many challenges to overcome and we still do not have answers for all of Gaudi's ideas, such as the cross atop the cathedral," said Jordi Bonet i Armengol. "We probably still have twenty years before we reach that stage, but the technology we are using with Dassault Systèmes' PLM solutions is definitely helping us achieve a much more efficient pace towards the project's completion" •



### About T-Systems Iberia

T-Systems is a strategic business of the Deutsche Telekom Group and is one of the leading suppliers of ICT solutions in Europe. With 52,000 employees, T-Systems is the only supplier to offer single-source services. In Spain, the acquisition of Gedas has enabled T-Systems to extend its portfolio of solutions and leadership and offer a broader base of experience to its clients. T-Systems Iberia has more than forty offices in Spain, including Barcelona, Madrid, Bilbao and Valencia. T-Systems provides ICT expertise to many leading businesses and organisations, including Banco de Sabadell, Danone and the autonomous government of Catalonia (Generalitat de Catalunya). System integration solutions are a key part of T-Systems' business in Spain. [www.t-systems.es](http://www.t-systems.es)

The Sagrada Família Foundation, given the task of completing the temple's construction, put its confidence in Dassault Systèmes' solutions to carry out the project of mechanising the granite directly from 3D models.

Dassault Systèmes and their partner, IT consulting and service provider T-Systems Iberia, have worked with the La Sagrada Família's Board of Construction since 2001 to develop a mathematical algorithm that will permit stone-machining tools to overcome obstacles to the construction of the apse capital.

The general architect, Jordi Bonet i Armengol, said his team, thanks to the mathematical rules, can now continue Gaudi's project, started in 1882. It was in 1989 that architect Mark Burry first turned to IT solutions for the project's design. "We are

### About La Sagrada Família

Barcelona's Temple Expiatori de La Sagrada Família, which is still under construction, was designed by the great Catalan exponent of modern architecture, Antoni Gaudi (1852-1926). In 1883, 31-year-old Gaudi was charged with continuing the work begun shortly before on La Sagrada Família. Taking charge of the project, Gaudi changed it entirely (with the exception of part of the crypt, already completed) to put his own stamp on its architectural style. During the remaining 43 years of his life he focused intensely on this project and during the final dozen years before his death he worked on it exclusively. Gaudi lived to see the completion of only one of the cathedral's towers: the tower of Saint Barnaby. During the Spanish Civil War in 1936, Gaudi's workshop housing his designs and models was almost completely destroyed. Thus no plans remained detailing how the cathedral should be completed, except those already published and some broken plaster models. When construction of La Sagrada Família resumed in 1940, original plaster models had to be restored before it could be determined how the work should be continued to remain faithful to Gaudi's vision. In 2005, the cathedral's Nativity façade was declared a World Heritage Site by UNESCO.