



Detail view of steel fabrications at Beijing Olympic Stadium.

Sports facilities and stadia are seen by the world both live and at home as ever-greater sporting events fill our leisure time. Now considered an urban essential, these increasingly sophisticated arenas benefit from Dassault Systèmes' CATIA design-to-build technology that generates 3D models for a better outcome.

There are hundreds of new sports facilities being built across the world to host a range of events from The Olympics Games and Premier Division Football to horse and motor racing, tennis, gymnastics and swimming, as well as multi-purpose venues that enhance national, local and community sports activities.

Some of the best of these facilities, including the 2008 Beijing Olympics Stadium, are developed using CATIA advanced 3D model-based design-to-manufacture solutions from the 3D world leader, Dassault Systèmes and with the Gehry Technologies' Digital Project™ software platform. In preparation for both Beijing 2008 and the London's 2012

Olympics, CATIA is used to ensure that complex structures for the Games and their many associated activities are delivered on time, on budget and to the right specifications.

#### OLYMPIC GLORY

The foremost company working in this sector is Arup Sport whose work includes the 2008 Beijing Olympics Stadium, The London Olympics Aquatic Complex, the stunning Valencia Stadium, and new world-class stadia for Ukraine and the Middle East. Arup Sport Senior Structural Engineer, Kate McDougall, spoke of her work and the use of CATIA 3D-based model technology: "The stadia and sports facilities that Arup Sport is working on

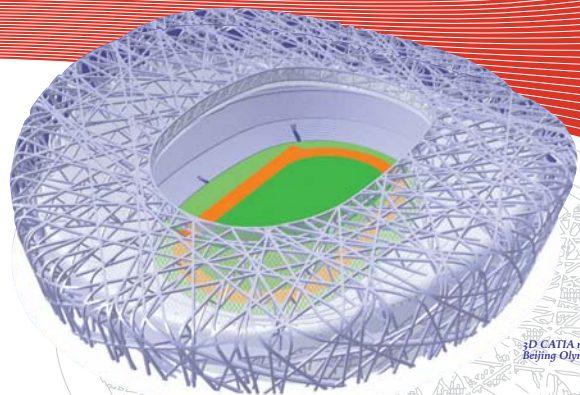
benefit from Dassault Systèmes' 3D modeling because of the functionality and flexibility that this methodology provides. Our work covers architectural design services, structural, mechanical and fire engineering as well as many other specialist technical services. Using 3D CATIA models, the information that we need is easy to access, update and integrate across the internal and external supply chains that we operate within."

Kate added, "Stadia are all unique and they always incorporate complex geometry. Coordinating their design, planning and construction involves making many changes and updates throughout the projects lifecycle. This process is enhanced and facilitated through the use of 3D digital models. The software allows us to save costs by developing a route to manufacture early in the project and also by allowing us to make use of standard components to improve quality and make financial savings. The CATIA 3D-based model methodology also makes checking efficient, easy and quick since complex geometry is modelled in three dimensions."

#### RULES OF THE GAME

CATIA has been used to design many roof systems for sports stadia. These are becoming important showpieces in themselves with their dramatic operation and engineering ingenuity. The complexity of these structures which often include intricate

## Pushing the Limits in Sports Facility Design



3D CATIA model of the Beijing Olympic Stadium.

By Nick Lerner

but large scale moving parts is ideal for development using CATIA which, with its kinematic and rules based capability is able to show a simulation of the moving roof and indicate potential clashes or other problems. Deploying CATIA in this situation it is possible to solve all potential problems through analysis and to refine the design digitally before any physical manufacturing commences.

**Productivity, creativity and elegance are available from CATIA.**

Kate McDougall, of Arup Sport added, "Roofs have to clear certain envelopes and must also operate with maximum efficiency. Developing optimum geometry and sections is made easier with CATIA because it enables the input of parameters that have an affect on the design, and allows automation of certain aspects in the design process."

#### TASTE OF VICTORY

Zaha Hadid Architects, the award-winning firm, has been commissioned with delivering the spectacular swimming complex for the London Olympics. Partner, Patrik Schumacher, a champion and user of 3D modeling software recently said, "Productivity, creativity and elegance... are available from Digital Project and the Dassault Systèmes software."

Geoff Haines, Managing Director of Desktop Engineering, the company that supplied and supports Digital Project and Dassault Systèmes' 3D modeling software at many architecture instead of architects and engineering companies including Zaha Hadid, Arup, SOM and Allies and Morrison said, "Dassault Systèmes' CATIA brings architects, sports facility developers and the AEC industry the proven benefits of large-scale design and manufacture software. The CATIA-based Building Information Model, BIM, is a complete set of data that includes 3D design and manufacturing information, as well as associated rules, methods and knowledge that govern all aspects of a building or development."

#### MIND GAMES

Lord Sebastian Coe, winner of the Olympic 1500m gold medal in 1980 and Chairman of the London Organising Committee for the Olympic Games (the organisation in charge of overseeing the development of the Olympic Games), is someone who certainly understands the significance of well-executed design in sports facilities. He recently spoke at the opening of a new training facility, "I know just how important that extra hundredth of a second can be and these facilities will enable athletes to develop and hone their technique allowing them to be at the top of their game."

in practice

ArupSport

dte  
DESKTOP ENGINEERING

Gehry Technologies

It is well known that great facilities enhance sports to produce better outcomes. Across the world CATIA users are developing and building ever-more advanced venues that help human beings excel at what they do best. ]

#### For more information:

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#### More about Gehry Technologies

Gehry Technologies is a consulting and development firm providing solutions tailored to the architecture, engineering and construction industry. Gehry Technologies is also a Dassault Systèmes CAA Gold Partner and embeds CATIA technology into its software platform. Digital Project™ is a revolutionary new software platform for building teams to realize ambitious building projects working through digital technologies. Gehry Technologies created Digital Project™, a CATIA-based Building Information Modeling (BIM) system that combines 3D design and data management capabilities with project experience gained while using Dassault Systèmes' 3D solutions over the years, and dedicated software developed by Gehry Technologies.  
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