5D VIRTUAL CONSTRUCTION 2006 Nova Award Nomination 27

What is the innovation?
Graphisoft's Virtual Construction solution transforms the entire construction process – from preconstruction planning and estimating to working on site. The solution encompasses Graphisoft Constructor, Graphisoft Estimator, Graphisoft Control, Graphisoft Change Manager, and Graphisoft Construction Professional Services.

The Virtual Construction suite of technologies employs 3D modeling to virtually construct the project. This process identifies constructability issues during design and/or preconstruction. The 3D model is further utilized to extract accurate estimating quantities and to analyze alternative construction sequences. Finally, design (3D), schedule (4D), and cost (5D) are all associated, so a change to any of the three automatically updates the other two.

Why is it innovative?
Graphisoft's Virtual Construction solution is the first and only application that integrates all the core processes required to successfully deliver projects to completion, including: design, estimating, scheduling, procurement, and site management. By linking the aforementioned tasks, Graphisoft's logistics and solutions help reduce the cost of building projects and identify constructability issues during the design and preconstruction phases.

In addition, construction companies improve their preconstruction services and gain a competitive edge – automating the numerous estimates and the subsequent revisions saves time and money and enables the opportunity to work on more projects. Further, for the same preconstruction fees, the construction company can deliver a 5D model to the owner. This model includes both building and site; the associated estimates and revisions over time; and the 4D schedule with associated movie, detailed site logistics, and construction work flow information.

The cost and schedule simulation feature also produces detailed presentations to boost owner confidence that projects will be delivered both on time and on budget. The Virtual Construction solution assures both contractors and owners of the accuracy of an estimate and details the cost implications of the alternative schedule evaluations offered by construction models. Predictability is also greatly enhanced by synchronizing any change in a project's design, cost or schedule.

What did the innovation change or replace?
Previously, general contractors relied upon 2D working drawings of the construction design and were unable to visualize the structure in 3D. This meant that construction errors would only be picked up and addressed at a later stage during construction – with the remedial work at this advanced stage adding massively to the cost. Also, the scheduling of work phases were not efficiently coordinated, adding to the notorious scale of 'waste' in terms of time, resources and man-hours in the construction sector. Additionally, the necessary manual elements in the procedures increased the likelihood or errors and confusion.

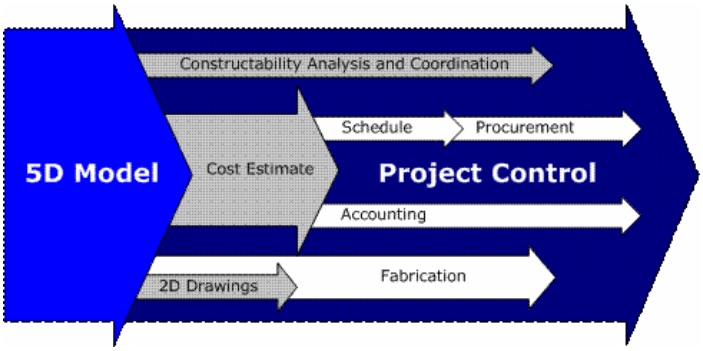
Where and when it originated, has been used, and is expected to be used in the future?
Origination: Graphisoft's Virtual Construction solution is based on six years of research, development and production by the YIT Corporation, based in Finland. Upon acquisition of this set of applications and services, Graphisoft further developed and honed them for the larger construction industry by working closely, over the last 18 months, with key customers, including California-based Webcor Builders and Finnish YIT Construction – a subsidiary of the YIT Corporation. The 3D modeling solution used to virtually construct projects was announced by Graphisoft Headquarters, Budapest, Hungary, in October 2004.

Current Use: Since implementing model-based estimating, YIT has doubled the amount of work the firm produces with the same number of estimators. YIT has also dramatically improved their bill of quantitative accuracy.
On the three design, bid, build projects Rogers Quinn Construction has done to date, they made the decision to build the virtual models after award of the projects at their own cost. The first project built virtually was a $20 million Student Resource Building on the UC Santa Barbara campus. On this project they focused on constructability review of construction documents, interference detection of building systems, trade coordination and work stream planning. By using the virtual model, they found over 140 constructability issues in the drawings and while they cannot say that there were cost savings (as it was a hard bid job) they do feel that they were able save thousands of dollars in what they would call "cost avoidance" by resolving the design issues with the design team and the University before they became field problems. The biggest advantage of using the virtual model was in interference detection & trade coordination of structural, MEP and fire systems as well as 6 week look-ahead planning and weekly work structuring of the sub trades.

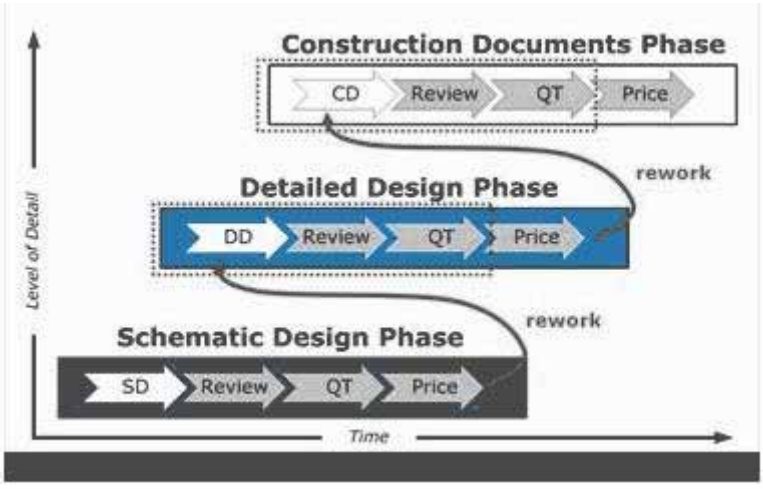
Future: The anticipated growth in 3D modeling in the construction industry will create a need for a new breed of professionals; construction modelers. By extracting the data inherent in every Virtual Construction model, these professionals will offer constructability analyses, more accurate estimates and the optimization of sequencing and procurement. More importantly, the fruits of their labor will be an overall reduction in project costs expected to be about 2-3 percent, plus the potential for further savings via the streamlining of project schedules.

(Note: This innovation was also nominated for the 2005 Nova Awards.)

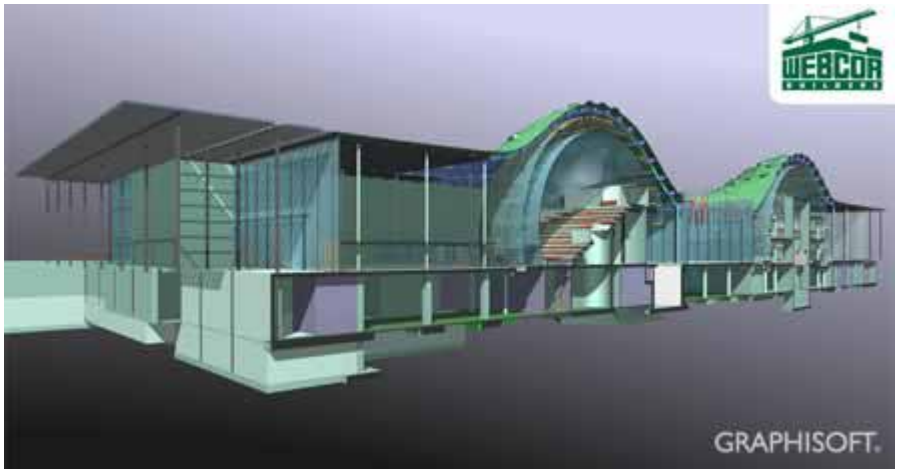
Contact: Dominic Gallello • Graphisoft • Graphisoft Park 1 • 1031 Budapest • Hungary
+36-1-437-3000 • Fax +36-1-437-3099 • dgallello@graphisoft.com • www.graphisoft.com



Graphisoft's Virtual Construction solution transforms the whole construction planning process. The solution encompasses Graphisoft Constructor, Graphisoft Estimator, DYNAProject and Graphisoft Construction Management Services.



Design/Estimating Integration



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