

The CAD Corporation, a Gauteng-based Autodesk software solutions provider founded in late 2009, has already been awarded Autodesk Gold Partner status in recognition of its ability to deliver complete Autodesk software solutions, maintain a high standard of customer support and strong customer satisfaction. *MechTech* talks to Leon Smalberger, the company's MD.

Product Design Suite: tailored for digital prototyping

As one of a handful of Autodesk Gold Partners in Africa, "The CAD Corporation has consistently demonstrated a high standard in the delivery of integrated engineering software solutions, constant service and support to industry and market impact, based in and around the Autodesk software solutions," begins Smalberger. "We are honoured to have achieved the status of Gold Partner. We feel that this award shows that we responded well to what were sometimes highly challenging market conditions. We work hard to understand the needs of our customers, assembling and utilising a highly specialised software-engineering team. Our aim has always been to solve our customers design problems, making them more productive, competitive and profitable. We are, and will always be, here to serve."

The company has enjoyed significant growth since its foundation in 2009, particularly in the past two years. "We have been one of the fastest growing Autodesk partners in the African region, growing by triple digits in the last 3 years. ~~600% in our first year and 180% and 138% in 2011 and 2012 respectively.~~ We are already one of the largest ~~the second largest~~ Autodesk Gold Partners in Africa, and we expect this growth to continue for several more years," Smalberger reveals.

Autodesk solutions consist of a large number of software applications for every conceivable aspect of engineering design. "But the applications are packaged into different software suites for the different industrial sectors." The CAD Corporation deals with four different sets of industrial solutions: Building Design Suite, a comprehensive set of modelling and workflow tools for architects and building professionals; Infrastructure Design Suite, a civil engineering and utility design suite for planning, designing and managing utility and civil infrastructure development projects; Plant Design Suite, for designing, modelling, and reviewing plant engineering projects; and the Autodesk mechanical and manufacturing offering, Product Design Suite, for the control of entire product design workflows, including 3D design, visualisation, simulation, and data management.

"Each of the different suites are tailored to suit the needs of the sector, but within each one we are also able to individually tailor solutions to meet clients' exact needs," Smalberger says. "At The CAD Corporation, we have teams of consultants with specific experience in each of these sectors, who can develop ways of making the software work efficiently and effectively in each particular workplace. And the expertise of our company's highly specialised technical people exactly mirrors the Autodesk software suites for the different industrial sectors," he adds

Product Design Suite and digital prototyping

Developed for product designers, mechanical and electrical engineers and engineering consultants, Autodesk's Product Design Suite consists of between 8 and 12 different software tools to best match needs at every point in a product or project development cycle. "At the suite's core is Inventor, the Autodesk solution for digital prototyping," Smalberger explains. It provides the tools to speed new products to market, helping consumer product manufacturers stay ahead of intense global competition with innovative designs, streamlined product development, and strong branding. "The idea is to shorten development costs and sustain a competitive advantage by using digital design to create and test multiple product iterations before you build physical prototypes," Smalberger explains.

Before moving to manufacture a product, like a piece of furniture or a new pump or a conveyor component, you would traditionally have had to build a physical prototype to make sure that the product worked, the components fitted together and that it could be manufactured easily. This would have had to be done by pattern makers and model builders, which was expensive and time consuming.

Digital prototyping changes all of that. It allows conceptual design, engineering, manufacturing, and sales and marketing departments to explore a complete product in the virtual domain before it is built. Once a design has been developed, it can be immediately analysed, optimised, validated, and visualised to check that it meets all of the design objectives. And because all of this is done digitally, this can be achieved much more quickly and cost effectively.

By digitally simulating and validating the real-world performance of a product design, manufacturers significantly reduce the number of physical prototypes they need to create and they can explore many more design alternatives before arriving at a preferred solution.

Product Design Suite consists of between 8 and 12 different software applications arranged in three package levels: standard, premium, and ultimate editions.

The central software program for each of these options is Autodesk Inventor (for the standard edition) or Autodesk Inventor Professional (for the premium or ultimate editions). Inventor is a comprehensive 3D CAD application for advanced mechanical engineering design; easy-to-use simulation; finite element analysis and motion simulation; data management; routed system and mould design. And Inventor also comes with several enhanced CAD productivity solutions, like AutoCAD integration, building information modeling (BIM) compatibility, CAD file conversion and data exchange and large assembly performance, to name but a few.

Also packaged in the Professional suites are several other supporting applications for different aspects of product design and digital prototyping.

- The ubiquitous AutoCAD products: AutoCAD Mechanical, which consists of AutoCAD with over 700 000 standards-based parts and tools for automating mechanical CAD tasks; AutoCAD Raster Design, which adds raster editing and raster-to-vector conversion tools to the software; and AutoCAD ReCap, a family of services for creating intelligent 3D models from captured images and laser data.
- Autodesk SketchBook Designer allows concepts to be quickly captured and explored and impressive illustrations to be produced. It is the industry's ultimate digital sketchbook.
- Autodesk Mudbox is able to create production-ready digital artwork using digital sculpting and texture painting technologies.
- Autodesk Showcase is an application to improve the design review process by allowing CAD data to be easily transformed into compelling imagery and presentations.
- Autodesk Vault, the company's solution for managing, tracking and organising CAD data, directly from within the design application suite.
- Autodesk Navisworks Simulate allows integrated models to be improved by team collaboration, simulated construction sequencing, and enhanced product reviews.
- Autodesk 3ds Max Design, which allows cinematic-quality visuals and movies to be created from CAD models in order to help market and sell the designs.

“Combined, all this enables users to innovate more easily, launch new products faster, and more efficiently manage the data and the supply chain,” believes Smalberger. “For South Africans, our biggest competitors are the overseas markets. Especially global companies with a presence here but with manufacturing and development resources in their home countries. We need to promote local design and competitive manufacturing in order to grow and create jobs.”

Smalberger believes that we have excellent local designers, engineers consulting to the mining industry, for example. “For products like pumps, fans and conveyors for the mining industry, local engineers are routinely using our products to customise and design products and systems. We compete on small volume high value products and plant, and while not all of the design work is done locally, significant amounts of it are. We support several consultants that provide services to the mining industry.

“From inside of the Autodesk Product Design Suite, a company can take an innovation from concept and initial design sketches, through detailed 3D design and analysis, and all the way through to visualisation, marketing and testing – without leaving the digital software environment. In the past, we would design a product, then build it, test it and fix it. Digital prototyping has allowed us to fix designs before they are built. The complete design cycle therefore becomes more cost competitive, less time consuming and much less risky.

“And as an Autodesk Gold Partner, we have the experience, expertise and the most value-for-money software tools to enable local people to realize these advantages,” Smalberger concludes.