

# Programming Ease Boosts Small Company in CAD Customization

## AR-CAD LLC

### Customer Description

AR-CAD LLC provides motion simulation, engineering and graphics software for companies using CAD (computer-aided design) systems in their operations. Their software products can be stand-alone or work as add-ins or customizations in programs like AutoCAD, Inventor, Solidworks, Alibre or SpaceClaim. The company specializes in developing motion add-ins, which allow customers to create machines or mechanical processes within their CAD systems and see visualizations of forces and motions in play based on physics. Users can then experiment with many configurations and spot problems before actual fabrication.

### A 20-Year Difference-Maker

AR-CAD has relied on the combined power and simplicity of VisualWorks Smalltalk as its technical advantage since 1991. The company co-founder, began using VisualWorks that year as the basis for creating an object oriented dynamics simulator. The advantage was immediately obvious to him.

"3D Multibody Dynamics is a complicated field," the co-founder says. "There are only about five software options available, and they were developed by large teams of programmers using Fortran or C++. I was able to develop one by myself using VisualWorks entirely."

AR-CAD developed its own CAD offering, "freeCAD: 3D CAD with Motion Simulation," which had its own graphical user interface.

In 2005, that product would be adapted as a motion add-in for Alibre CAD. In 2010, a motion add-in was crafted for Inventor CAD, and one was also completed for Solidworks CAD. Additional advances were made in creating a motion add-in for SpaceClaim CAD, which also included other customized add-ins developed by AR-CAD.

A die automation CAD was also created with VisualWorks.

### Goal

Find a solution that allows small teams to compete with larger players in creating engineering add-ins for high-tech CAD environments. This solution must be physics based and allow users to visualize tolerances and the impact of physical forces.

### Challenge

The technology must:

- Maximize the abilities of a small team through increased programming productivity.
- Integrate well within popular CAD programs such as AutoCAD, Inventor, Solidworks, Alibre and SpaceClaim.
- Be easy to understand.
- Facilitate software debugging.

### Results (With Cincom® VisualWorks®)

- Cincom VisualWorks allows companies to stay on equal footing with competitors that rely on more complex programming languages as the foundation for their CAD motion simulators.
- Its clean syntax and pure object oriented paradigm allows programmers to convert the problem domain into working code more easily and faithfully.
- The debugger and inspectors encourage fearless exploration of the code to fix programming problems.

## Competitive Advantages

Cincom VisualWorks is the development environment built with Smalltalk for Smalltalk.

The seamless integration of the environment with the programming language promotes coding flexibility unsurpassed by any other. AR-CAD can develop sophisticated CAD add-ins faster because of the empowerment produced by using Cincom VisualWorks. Programming productivity is high, because the product is easy to use and easy to understand. When problems do arise, AR-CAD credits VisualWorks for having an excellent debugger to fix them.

As a mature programming option, VisualWorks has also enabled AR-CAD to choose from a variety of software options that have helped the company develop its products. Some of the Smalltalk programs that they have benefitted from include:

- Business Graphics Object Kit
- Binary Object Streaming Service
- Advanced Tools Parser Compiler
- DLL and C Connect
- GF/ST Graphics Framework
- Jun for Smalltalk Graphics Library
- RSA encryption

## A Great Solution – Then and Now

After having used Smalltalk for more than 20 years, AR-CAD still sees a great future ahead for additional Smalltalk projects. The company's co-founder, believes it remains the best solution available. He is currently using Cincom VisualWorks to develop products for a new class of applications.

"I am convinced Smalltalk is the most productive programming environment," The co-founder says. "I will use it to conquer the area of Computer-Aided Design, Simulation and Manufacturing (CADSM)."



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