

CASE STUDY

Market: Conceptual engineering, industrial design, CAE model preparation and manufacturing engineering

Product: 3D ACIS Modeler, Deformable Modeling, 3D InterOp Translators

Challenge: SpaceClaim required a robust 3D modeling kernel with the flexibility and capacity to be customized, and sought a vendor who would accommodate very specific development needs

Solution: Spatial 3D ACIS Modeler for geometry creation and modification, and 3D InterOp Translators for data exchange

Results: SpaceClaim and Spatial worked closely to meet the challenging design requirements. The strength of this collaboration supported SpaceClaim's goal to deliver 3D direct modelers that enable engineers and industrial designers to engage in conceptual design and model preparation, to work concurrently, and to drive innovation quickly and cost effectively.



SpaceClaim Corporation

SpaceClaim's 3D Direct Modeling solutions enable engineers and industrial designers to perform up-front conceptual design, product ideation, and model preparation for complex engineering analysis and simulation.

COMPANY

SpaceClaim offers 3D Direct Modeling solutions ideal for up-front conceptual design, product ideation, and the preparation of models for complex engineering analysis and simulation. The software enables engineers and industrial designers to engage in simulation-driven product development to release design constraints, foster creativity early in the process and reduce time-to-market and overall costs.

SpaceClaim provides its users with the freedom and flexibility to capture ideas easily, make dramatic edits to models from any CAD system, and prepare models for simulation analysis, digital prototyping, and manufacturing. Using SpaceClaim, engineers and industrial designers can work concurrently and finish projects in a fraction of the time, enabling manufacturers to deliver products to market faster.

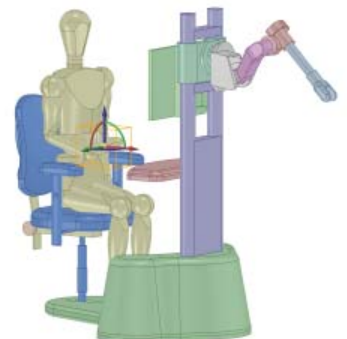
Prime markets for SpaceClaim span engineering organizations in medical devices, aerospace, industrial equipment, consumer product manufacturing, renewable energy, and automotive industries. SpaceClaim is sold world-wide and is available in English, French, German, Spanish, Italian, Japanese, Korean, and Simplified and Traditional Chinese.

SpaceClaim's 3D direct modelers were created from the ground up and represent the most significant technology advancement in 3D engineering in more than ten years. While feature-based CAD products are very powerful and perform well for detailed design work, they are not appropriate for conceptual design, engineering analysis, and simulation-driven design. SpaceClaim is very easy to learn and use, cost effective, and very accurate, driving improved innovation and collaboration.

SpaceClaim Engineer is a fast, simple, and powerful 3D direct modeler for top-down design, 3D layout, conceptual engineering, and model preparation for simulation and analysis. Unique capabilities include intuitive Pull, Move, Fill, and Combine tools for robust model editing as well as straightforward 2D and cross-section modeling.

"Spatial's willingness to significantly modify its technology at the geometry level to accommodate our goals drove our decision to choose ACIS. The progression in feature advancements we've been able to make from version to version has been dramatic thanks to Spatial's responsiveness."

Frank DeSimone
Senior Director of Research and Development
SpaceClaim Corporation



CASE STUDY - SpaceClaim Corporation

SpaceClaim Style brings 3D solid modeling to industrial designers and product stylists. Users get a rapid creation environment that enables flexible design capabilities and converts hand-drawn, 2D, and surface data to accurate solid models.

CHALLENGE

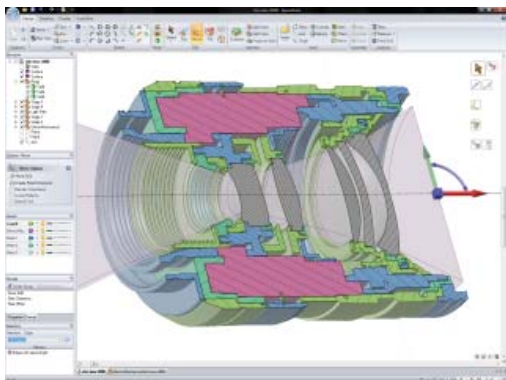
SpaceClaim's team wanted to partner with a 3D software component company to develop SpaceClaim's modeling engine. SpaceClaim had specific development requirements, such as maintaining a close working relationship with the vendor, the ability to perform development work overseas, and the overall ability to be responsive to special feature requests.

SpaceClaim envisioned enabling users to be able to pull on aspects of a model and have everything else adapt, on the fly, without predefined relationships or associations between geometry. "When we talked to Spatial developers what we'd hear constantly is that we were placing demands on the kernel to do things no one had ever asked it to do before," says Frank DeSimone, SpaceClaim Senior Director of Research and Development, and the architect of the User Interaction Model for the software.

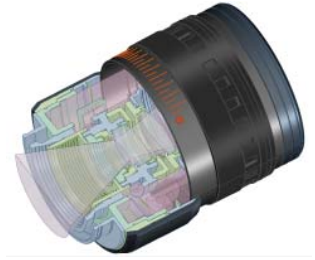
SOLUTION

DeSimone says the willingness of Spatial to meet SpaceClaim's special development requirements was superior to other potential partners. For example, while prototyping the first release of its software, SpaceClaim came upon special requirements – in fact hundreds of them – with Spatial being willing to adapt its kernel to accommodate these special situations. Spatial's willingness to work side by side with SpaceClaim to address a range of development challenges was emblematic of the entire relationship, notes DeSimone.

Another requirement demanded that the software automatically fill in a cylinder where there had been a face in the case of two cylinders conjoined at an angle with a round at the intersection. Without this capability if the user pulled them apart, the round would fail and the operation aborted.



Spatial was able to deliver the required enhancement. This was critical to ensure SpaceClaim's usability. Conveying the sense of fluid movement gives the user the power to quickly change the models and see the results on the fly, without a step to calculate and maintain all the relationships and then make the moves that would be associated with feature-based modeling.



Often to make changes to a model the user has to remove rounds, make the changes on basic geometry and then replace the rounds. "Round recognition and removal has been a key function that Spatial has gone the extra mile to develop," says DeSimone. "That development effort wouldn't have been possible without many conversations back and forth to improve our ability to move solids and Spatial's ability to detect them and fill in the voids that are left when the rounds are removed."

Taking advantage of Spatial's deformable modeling technology has enabled SpaceClaim to strengthen two main application areas – CAE model preparation and industrial design/conceptual engineering. CAE model preparation typically involves data transfer and deals with less than perfect geometry. Users need just a few tools to clean up gaps, smooth a surface or replace a surface with a simpler version of itself in order for it to be analyzed. "We found that incorporating deformable modeling with the model preparation tools lets our users make even bad models editable," notes De Simone.

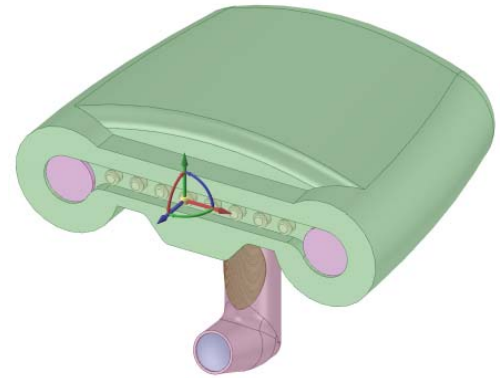
In the industrial design space, ACIS enabled SpaceClaim to provide unique capabilities. While most direct modelers can pick on a plane and move it around with its planar neighbors, SpaceClaim can take fairly complex surfaces and change them even if connections to neighboring surfaces are less than perfect.

SpaceClaim also chose 3D InterOp Translators for data exchange capabilities between ACIS and CATIA V5, CATIA V4, Unigraphics NX, Pro/ENGINEER, SolidWorks, Inventor, Parasolid, IGES, STEP, and VDA formats. Key for a direct modeler is its ability to take formats from other CAD systems and translate them flawlessly, or at least no worse than they appeared in their original system. SpaceClaim worked closely with Spatial to tailor the Spatial InterOp translator API, and deliver enhancements to translators based on SpaceClaim customer requirements. For example, enhancements in the area of product manufacturing information (PMI) from CATIA models were provided to ensure that PMI be accurately exported out of SpaceClaim.

CASE STUDY - SpaceClaim Corporation

Integral to SpaceClaim's commitment to Spatial was its purchase of a Partner Level support package. Partner Level support provides SpaceClaim with a preferred selection of consulting, on-site development resources, project management, and implementation assistance. These options provide direct benefits, including best practices for optimized code at the initial release, faster time-to-market, reduced costs, and proper allocation of core resources.

"Spatial's partnering model made sound business sense, and allowed us to focus on our core competencies," says DeSimone. "We chose Spatial as a partner for their responsive service, flexible and expansive line of 3D products, and commitment to advance key technologies that directly support SpaceClaim's innovative approach to working in 3D."



RESULTS

Thanks to the close collaboration with Spatial developers, SpaceClaim is able to deliver an intuitive 3D direct modeling environment that gives engineers and designers the freedom and flexibility to capture fresh ideas easily, make dramatic edits to models from any CAD system, and prepare models for simulation analysis, digital prototyping, and manufacturing.

Key to the success of the ACIS kernel and 3D CAD file translator integration was access to ACIS code and open communications between the SpaceClaim and Spatial teams. "Spatial understood the changes that had to be made on the kernel level to enable the changes at the user level," says DeSimone. "They let us frame all sorts of requirements and questions and worked with us to drive usability."

SpaceClaim developers were impressed with how many improvements would be delivered with each new ACIS release. "The progression was extremely dramatic," says DeSimone. "We were pleasantly surprised with each fully functioning release, which enabled us to move more quickly than anticipated with the UI on the user interaction level."



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