

ARRI® Uses CoCreate® Modeling™ to Meet Film Industry's Demand for Highly Advanced Cameras

Explicit modeling approach from PTC helps to spur development and innovation

ARRI, Vienna, Austria

ARRI was established in 1986 as a research and development center for Arnold & Richter. Recipient of numerous Academy Awards®, ARRI is reknown for their development and innovation in the design and manufacture of advanced camera systems specifically designed for the motion picture entertainment industry.

For 90 years ARRI products have evolved constantly to meet the exacting demands of leading filmmakers. ARRI equipment has proven itself time and again both on set and in the most extreme climatic conditions, from the frozen arctic and the scorching desert to the depths of the ocean and even to outer space. Today, ARRI's cameras are at work within most major international film studios worldwide.

The Challenge: Find the Best 3D CAD for Designing Tough, Innovative Cameras Fast

Developing high-tech cameras for the film industry isn't easy. Companies have to meet demanding customer requirements and incorporate fresh technologies into every model. Usually, that demand leads to intense pressure to innovate each design as never before. But no matter how revolutionary the camera, one thing can't change: all of ARRI cameras must endure tough field conditions over a long service life of 20 years or more. For ARRI product designers, the perfect design software needed to accommodate multiple changes, even late in the cycle. As well, the software needed to be user-friendly, enabling designers to easily transfer designs to production.

The Solution: CoCreate from PTC

For years, ARRI in Vienna has relied on CoCreate products from PTC for the development of its high-tech cameras for the film industry. This long-term strategic cooperation has paid off, says Josef Handler, Mechanical Development Engineer at ARRI. He says CoCreate's explicit modeling is key to helping ARRI respond to intense competitive pressure to develop innovative cameras for the film industry. Today, ARRI is using a variety of CoCreate solutions, including CoCreate Modeling for 3D product development, CoCreate Model Manager for product data management (PDM), and CoCreate 3D Access for viewing and sharing 3D CAD data across the enterprise.



The state-of-the-art ARRI Model 16SR4 camera was designed with CoCreate Modeling.

Result: Breakthrough Camera Delivered in Record Time

CoCreate Modeling proved to be the ideal design tool for ARRI to develop a groundbreaking new product: The ARRI model 416 – the quietest 16 mm camera on the market. Because CoCreate enables users to make changes 'on the fly', ARRI designers could make unlimited changes to the design – quickly – right up to the final prototypes. And because of the software's ease of use, one designer could easily pick up the design where another left off, enabling the group to achieve maximum productivity during the project. Plus, transferring the model from development to production was easy, thanks to CoCreate Modeling and its add-on CoCreate Model Manager, a PDM solution designed specifically for highly-iterative, work-in-progress design environments.

“80% to 90% of a camera has to be developed completely from scratch because the technology changes at lightning speed, especially for electronics and optics. We incorporate changes in the camera throughout the entire process, right up to market maturity. Explicit modeling with PTC CoCreate gives us just the right modeling method.”

– Josef Handler, Mechanical Development Engineer, ARRI

New Camera Makes ARRI the Global Leader in Low-Noise Cameras

Throughout its history, ARRI has responded to the challenges of competing in the demanding motion picture industry, most recently with the development of the 416 – the fourth-generation 16-mm sound camera. For this model, the customers' wish list was long, including an improved viewfinder, a lightweight design and, above all, a low noise level.

“The design process was extremely complex,” says Josef Handler, Mechanical Development Engineer at ARRI. “New ideas, which no one had considered before, had to be incorporated constantly. The designs improved (and changed), up until the first prototypes were manufactured.”

Implementing the low-noise, compact, 16-mm sound Camera 416 involved numerous decisions: What process should be used to control the camera? Where do we position the switches and buttons? What type of magazine catch, and which direction of rotation for closing?

Fortunately, the team used CoCreate Modeling to produce its designs. CoCreate Modeling takes an explicit approach to design, where engineers can work directly on the model geometry, like working with a piece of clay. While many product designers use a parametric approach to design, the explicit approach is especially well-suited for situations where changes are frequent, and might even come late in development. Plus, CoCreate offers the benefit of enabling designers to easily pick up others' projects, because users don't need to understand the intent of the previous designer to work on a model.

Designers also had to consider the accurate positioning of all components, as well as the camera's compact design. And, just as importantly, the camera needed to be service-friendly. For that, design engineers sent prints of the electronic components to the mechanical design department as IDF files. Based on the solid model derived from these prints, designers then saw the exact space requirements to keep the 416 extremely compact.

Changes – Unavoidable

Changes were being made to the model of the 416 until shortly before market maturity. When many highly paid Hollywood stars are on the set waiting for shooting to start, the camera has to be reliable—over a period of many years. So the quality standards at ARRI are high. The company tests prototypes under extreme conditions because the cameras have to function at temperatures from -20 to 50 degrees Celsius and relative humidity between 40% and 95%.

But that's not all. After successful completion of the tests in the climatic chamber, the camera goes to the set to test its suitability for everyday use. Not every movement made by a cameraman on the set is foreseeable; feedback on the set led to last-minute design changes.

Again, CoCreate Modeling came through. “CoCreate Modeling gives us the necessary flexibility to implement changes literally at the last minute,” says Handler. “That was essential for the 416.”

Universal Changes – Without End

The development of a model does not end with market launch. Like the production of the cameras, change management is supervised in Munich.

But transferring the model from development to production was easy. CoCreate Modeling and its add-on CoCreate Model Manager together provided the tools and the change management they needed. CoCreate Model Manager is a Product Data Management (PDM) solution specialized for highly iterative, work-in-progress design environments.

“At ARRI, the Munich manufacturing team doesn't have to know the original development or design intentions of designers; the design and functions of the entire camera appears right on the monitor, making everything easy to understand,” says Handler.

With this type of universal cooperation, it has proven worthwhile for ARRI to rely on product data management with PTC CoCreate Model Manager early on in the process. Plus, the company takes advantage of CoCreate's 3D viewer software, so product stakeholders who aren't CAD engineers can also see what's in development.

“With the CAD viewer CoCreate 3D Access, all the information we need is readily available for all employees outside of the design department at the press of a button,” concluded Handler.

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