13 Rebirth in the Virtual Universe
Translating virtual products into their real-world counterparts is still a challenge. But as Siemens closes this gap, a universe of possibilities is materializing.

16 Journey to a Unified World
Siemens’ acquisition of UGS has given its Automation and Drives Group the tools to merge the real and virtual worlds of production.

23 Blending Realities
Simulated factories contain thousands of parameters for real machines. Their models are being used to calculate optimized arrangements and ergonomics.

26 Simply the Best
Siemens’ components plant in Amberg, Germany, has been named Europe’s Best Factory. The keys to its success are innovation and highly motivated employees.

30 Trains of Bits and Bytes
Siemens and its international partners are using virtual reality to design, assemble and test entire trains.

33 Optimizing Throughput
Workflow simulation learned from developing factory environments is helping to optimize a radiation therapy center.

39 Rethinking Manufacturing
Interview with Roddy Martin, general manager of AMR Research.

By 2020 manufacturers will be able to move from idea to finished product in a fraction of the time that is now required. The reason: even the most complex products — and their associated production processes — will be designed and tested to perfection in the virtual world.
that could detach itself with the user in it, plot its home vehicle on its own or be sent on inde
dependent errands. Deadline: 60 days for a production-compatible virtual prototype.

When my boss asked me to take charge of the project, I all could say was “Wow!” Our engi
neers were on the road — Dubai, Paris. You name it. But hey, what else is new? I assembled a team of specialists and alerted everyone to the new file I had opened in our online project database. The file, which I called “Xtratst,” in
cluded all of the customer’s specifications, as well as 3D interactive models of the vehicles it would be an option on.

No sooner was the file activated, than a program automatically began scouring all of our suppliers’ databases for everything from self-inflating, luminescent tires to special-order scooter wedge brake systems. Within minutes a list of potentially-applicable components, com
plete with specs, prices, availability, earliest de
livery dates, and 3D interactive models if the component existed, had been assembled. This information, along with everything each team developed, was instantly available to everyone on an interactive basis using a secure database backbone.

Design was divided along classic lines: me
chanical engineers, electrical engineers and software and automation experts, plus a core of course production planners. But as the design took shape, a mechatronic program integrated the data from these specialists into a holistic functional object. When a few lines of software were altered, for instance, the guys working on related mechanical and electrical systems could see how the change affected their work.

Of course, a lot of the stuff was strictly off
the-shelf easy. The vision, radar and navigation related mechanical and electrical systems were altered, for instance, the guys working on the “seat’s appearance in one of his company’s top
-of-the-line cars,” he walked along the produc
tion line studying the rapid movements of ro
botic arms, noting the hum of conveyer belts, the crisp sounds of components being snapped together by avatars in the distance. Stopping next to the thick acrylic cover shielding a pow
der-coating booth, he distractedly slid his hand along its corner as he watched the machine’s arm hurtle downwards, exhaling a muted pneu
matic hiss. A pale sheen of red appeared where his hand had passed along the translucent sur
face. “Ouch,” he exclaimed, suddenly looking over his shoulder. “You were too close. What’s more, every part was designed to be recycled, and every al
teration was automatically documented.

Virtual prototypes of mechanical assemblies were tested, as were the machining steps re
quired to produce them. Nothing was left to chance. After 60 days — just as the customer had requested — virtual prototypes of the seat, its production process, and its supply chain, including packaging and delivery schedule, were ready for simulation. The prototypes were, for all practical purposes, identical in every detail to what would ultimately be built.

The customer’s project manager, a smooth
talking fellow by the name of Carson who had been involved in the product and production development process from the word go, visited our walk-in Website—a prototype version of our own right that uses 3D virtual presence soft
ware to create the illusion of real time interac
tivity in a simulated environment.

Once in the “site,” Carson examined the seat’s appearance in one of his company’s top
-of-the-line cars; he walked along the produc
tion line studying the rapid movements of ro
botic arms, noting the hum of conveyer belts, the crisp sounds of components being snapped together by avatars in the distance. Stopping next to the thick acrylic cover shielding a pow
der-coating booth, he distractedly slid his hand along its corner as he watched the machine’s arm hurtle downwards, exhaling a muted pneu
matic hiss. A pale sheen of red appeared where his hand had passed along the translucent sur
face. “Ouch,” he exclaimed, suddenly looking over his shoulder. “You were too close. What’s more, every part was designed to be recycled, and every al
teration was automatically documented.

Virtual prototypes of mechanical assemblies were tested, as were the machining steps re
quired to produce them. Nothing was left to chance. After 60 days — just as the customer had requested — virtual prototypes of the seat, its production process, and its supply chain, including packaging and delivery schedule, were ready for simulation. The prototypes were, for all practical purposes, identical in every detail to what would ultimately be built.

The customer’s project manager, a smooth
talking fellow by the name of Carson who had been involved in the product and production development process from the word go, visited our walk-in Website—a prototype version of our own right that uses 3D virtual presence soft
ware to create the illusion of real time interac
tivity in a simulated environment.

Once in the “site,” Carson examined the seat’s appearance in one of his company’s top
-of-the-line cars; he walked along the produc
tion line studying the rapid movements of ro
botic arms, noting the hum of conveyer belts, the crisp sounds of components being snapped together by avatars in the distance. Stopping next to the thick acrylic cover shielding a pow
der-coating booth, he distractedly slid his hand along its corner as he watched the machine’s arm hurtle downwards, exhaling a muted pneu
matic hiss. A pale sheen of red appeared where his hand had passed along the translucent sur
face. “Ouch,” he exclaimed, suddenly looking over his shoulder. “You were too close. What’s more, every part was designed to be recycled, and every al
teration was automatically documented.

Virtual prototypes of mechanical assemblies were tested, as were the machining steps re
quired to produce them. Nothing was left to chance. After 60 days — just as the customer had requested — virtual prototypes of the seat, its production process, and its supply chain, including packaging and delivery schedule, were ready for simulation. The prototypes were, for all practical purposes, identical in every detail to what would ultimately be built.

The customer’s project manager, a smooth
talking fellow by the name of Carson who had been involved in the product and production development process from the word go, visited our walk-in Website—a prototype version of our own right that uses 3D virtual presence soft
ware to create the illusion of real time interac
tivity in a simulated environment.

Once in the “site,” Carson examined the seat’s appearance in one of his company’s top
-of-the-line cars; he walked along the produc
tion line studying the rapid movements of ro
botic arms, noting the hum of conveyer belts, the crisp sounds of components being snapped together by avatars in the distance. Stopping next to the thick acrylic cover shielding a pow
der-coating booth, he distractedly slid his hand along its corner as he watched the machine’s arm hurtle downwards, exhaling a muted pneu
matic hiss. A pale sheen of red appeared where his hand had passed along the translucent sur
face. “Ouch,” he exclaimed, suddenly looking over his shoulder. “You were too close. What’s more, every part was designed to be recycled, and every al
teration was automatically documented.

Virtual prototypes of mechanical assemblies were tested, as were the machining steps re
quired to produce them. Nothing was left to chance. After 60 days — just as the customer had requested — virtual prototypes of the seat, its production process, and its supply chain, including packaging and delivery schedule, were ready for simulation. The prototypes were, for all practical purposes, identical in every detail to what would ultimately be built.

The customer’s project manager, a smooth
talking fellow by the name of Carson who had been involved in the product and production development process from the word go, visited our walk-in Website—a prototype version of our own right that uses 3D virtual presence soft
ware to create the illusion of real time interac
tivity in a simulated environment.

Once in the “site,” Carson examined the seat’s appearance in one of his company’s top
-of-the-line cars; he walked along the produc
tion line studying the rapid movements of ro
botic arms, noting the hum of conveyer belts, the crisp sounds of components being snapped together by avatars in the distance. Stopping next to the thick acrylic cover shielding a pow
der-coating booth, he distractedly slid his hand along its corner as he watched the machine’s arm hurtle downwards, exhaling a muted pneu
matic hiss. A pale sheen of red appeared where his hand had passed along the translucent sur
face. “Ouch,” he exclaimed, suddenly looking over his shoulder. “You were too close. What’s more, every part was designed to be recycled, and every al
teration was automatically documented.

Virtual prototypes of mechanical assemblies were tested, as were the machining steps re
quired to produce them. Nothing was left to chance. After 60 days — just as the customer had requested — virtual prototypes of the seat, its production process, and its supply chain, including packaging and delivery schedule, were ready for simulation. The prototypes were, for all practical purposes, identical in every detail to what would ultimately be built.

The customer’s project manager, a smooth
talking fellow by the name of Carson who had been involved in the product and production development process from the word go, visited our walk-in Website—a prototype version of our own right that uses 3D virtual presence soft
ware to create the illusion of real time interac
tivity in a simulated environment.

Once in the “site,” Carson examined the seat’s appearance in one of his company’s top
-of-the-line cars; he walked along the produc
tion line studying the rapid movements of ro
botic arms, noting the hum of conveyer belts, the crisp sounds of components being snapped together by avatars in the distance. Stopping next to the thick acrylic cover shielding a pow
der-coating booth, he distractedly slid his hand along its corner as he watched the machine’s arm hurtle downwards, exhaling a muted pneu
matic hiss. A pale sheen of red appeared where his hand had passed along the translucent sur
face. “Ouch,” he exclaimed, suddenly looking over his shoulder. “You were too close. What’s more, every part was designed to be recycled, and every al
teration was automatically documented.

Virtual prototypes of mechanical assemblies were tested, as were the machining steps re
quired to produce them. Nothing was left to chance. After 60 days — just as the customer had requested — virtual prototypes of the seat, its production process, and its supply chain, including packaging and delivery schedule, were ready for simulation. The prototypes were, for all practical purposes, identical in every detail to what would ultimately be built.

The customer’s project manager, a smooth
talking fellow by the name of Carson who had been involved in the product and production development process from the word go, visited our walk-in Website—a prototype version of our own right that uses 3D virtual presence soft
ware to create the illusion of real time interac
tivity in a simulated environment.

Once in the “site,” Carson examined the seat’s appearance in one of his company’s top
-of-the-line cars; he walked along the produc
tion line studying the rapid movements of ro
botic arms, noting the hum of conveyer belts, the crisp sounds of components being snapped together by avatars in the distance. Stopping next to the thick acrylic cover shielding a pow
der-coating booth, he distractedly slid his hand along its corner as he watched the machine’s arm hurtle downwards, exhaling a muted pneu
matic hiss. A pale sheen of red appeared where his hand had passed along the translucent sur
face. “Ouch,” he exclaimed, suddenly looking over his shoulder. “You were too close. What’s more, every part was designed to be recycled, and every al
teration was automatically documented.

Virtual prototypes of mechanical assemblies were tested, as were the machining steps re
quired to produce them. Nothing was left to chance. After 60 days — just as the customer had requested — virtual prototypes of the seat, its production process, and its supply chain, including packaging and delivery schedule, were ready for simulation. The prototypes were, for all practical purposes, identical in every detail to what would ultimately be built.

The customer’s project manager, a smooth
talking fellow by the name of Carson who had been involved in the product and production development process from the word go, visited our walk-in Website—a prototype version of our own right that uses 3D virtual presence soft
ware to create the illusion of real time interac
tivity in a simulated environment.