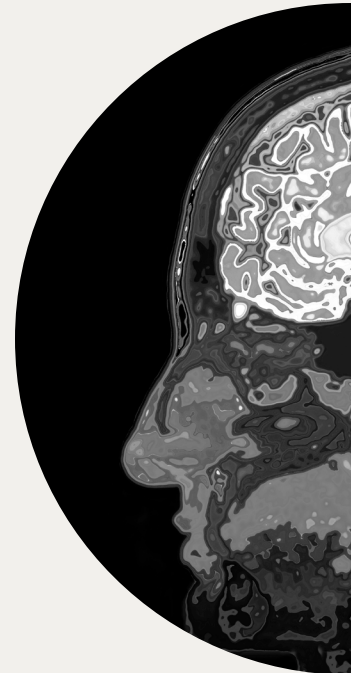


Educating patients and clinicians with 3D printed anatomic models

In partnership with Merative, Ricoh USA broadens
access to 3D printing in healthcare



Additive manufacturing, or 3D printing, holds enormous promise for healthcare providers. Patients, physicians and medical students all benefit from the ability to create detailed anatomic models from a patient's radiological imagery.



"If a surgeon is going to operate on a patient, they need to get the patient's informed consent, which means the patient really needs to understand the procedure," says Gary Turner, Managing Director, Additive Manufacturing, North America at Ricoh USA, Inc., an integrated services provider and partner that connects technology and processes. "Nothing explains it better than being able to hold in your hand a physical representation of the patient's exact anatomy to show the patient what you're going to do."

Medical schools and researchers can also benefit from using models for cadaver-free physician training and to study rare conditions.

There are barriers, however, to making the technology broadly available to healthcare providers. The process of "segmenting" images such as CT scans and MRIs to identify the anatomic areas for 3D printing can be complicated, requiring much back and forth between surgeons, radiologists and 3D printing technicians. Complex segmentation can take hours of scarce biomedical engineering time.

Such barriers have caused 3D printing to be less available than it should be—perhaps only 5%–10% of physicians have access. "Currently, access to 3D-printed models is limited to very few healthcare organizations, meaning the vast majority of clinicians and their patients cannot benefit from this critical tool," says Turner.

This need led Ricoh USA to offer 3D printing to the healthcare market, aiming to "democratize" access by making it broadly available across North America and easy for physicians to use. 3D printing for healthcare supports the company's mission to improve life by solving societal problems. And as a leader in managed services, Ricoh USA has the people, processes and printing technology to resolve the pain points. Yet 3D printing for healthcare is a unique use case. Medical staff and hospitals have their own clinical workflows that the solution must support. Regulatory compliance must be considered. Plus, the solution needs the power and intelligence to process the image segmentation that creates the 3D printable files.

These factors caused Ricoh USA executives to seek a partner with advanced imaging technology and domain expertise — both essential to healthcare success. They chose imaging solutions from Merative.

Collaborating with Merative for software development helped Ricoh USA

jump- start

its 3D printing healthcare service

IBM iConnect Access (by Merative) software features workflow and technology that help

create

3D printed anatomic models

By engaging the installed base of iConnect Access software, Ricoh USA can

boost

access to its 3D printing service

“I think it’s important to recognize the collaborative approach that Merative software developers and product managers took with us to build exactly what we needed. It was an extensive process that was extremely successful.”

Gary Turner
Managing Director, Additive Manufacturing, North America
Ricoh USA, Inc.

Co-creating an interactive solution

By partnering with Merative, a data, analytics and technology partner for the health industry, Ricoh USA gained the help it needed to create a broadly accessible 3D print service. Merative's key contributions were domain and imaging expertise and a strong industry presence through its IBM iConnect® Access (by Merative) software. A web-based, FDA 510(k)-cleared, HIPAA-compliant medical image viewer, iConnect Access enables healthcare providers to aggregate, exchange and access medical imaging data across the enterprise and the extended care team.

With personnel at many hundreds of facilities already using iConnect Access for medical image sharing and management, it was the ideal platform for adding 3D printing functionality. "iConnect Access provides the interoperability across the radiology department, the surgical teams and the printing technicians who make 3D printing workflow happen," says Ryan Hess, Director, Innovation and Strategy, Additive Manufacturing at Ricoh USA. "It offers the communications as well as the ability to pass along imaging data that sits in each of those areas."

The Merative–Ricoch USA partnership began with a software development project to enhance iConnect Access with support for 3D printing workflow and interactive image segmentation. "iConnect Access is built on the foundation that automation can be applied to segmentation, and Merative is committed to furthering the automation that exists today," says Hess.

The collaboration began with two IBM Design Thinking workshops, which provided insights into iConnect Access capabilities and what needed to be added for 3D printing workflow. The workshops also determined how the tool would interface with Ricoh USA's case management portal that links the 3D printing and healthcare teams. All stakeholders had input into solution requirements, including a well-known segmentation expert and physicians who will use the solution.

"As we moved through the iterative Design Thinking process, we explored which data was relevant, how we could move it from one place to another and what we could do with it," says Hess. "We worked well together because the Merative



team understood interoperability and the Ricoh team understood how the interoperability could translate into physical output.” The sessions ended with a detailed requirements document passed on to developers.

The partnership continued strong during the give and take between the Ricoh USA and Merative development teams. “I think it’s important to recognize the collaborative approach that Merative software developers and product managers took with us to build exactly what we needed,” says Turner. “It was an extensive process that was extremely successful.”

The project resulted in RICOH 3D for Healthcare, an integrated end-to-end workflow solution that makes the development, design and production of 3D-printed anatomic models simple, accurate and easy. RICOH 3D for Healthcare makes it possible for healthcare providers nationwide to develop patient-specific representations of tissue and bone. The lifelike replicas serve as physical simulators to help clinicians see inside anatomy for greater visibility into patient needs. These 3D-printed replicas are for nondiagnostic/treatment use. Hospitals already using iConnect Access

can simply upgrade to activate the tool’s FDA 510(k)-cleared 3D image segmentation and workflow features. A range of functions empower physicians to edit patient images to their specifications.

Once segmentation is complete, the tool communicates the 3D print file to the Ricoh USA case management and workflow portal, where biomedical engineers take over. Their work includes communicating with physicians to finalize model design and to document all decisions. This step is crucial because the models can vary considerably. For instance, a physician may request to color a tumor red so it stands out, to use materials of different flexibility to simulate actual organs, or to cut a model in half to expose the interior.

Next, the clinician reviews the working image in the iConnect Access viewer. “This is very important,” explains Turner, “because it’s the tool they’re already using.” The approved design then moves into 3D manufacturing for printing and quality control, and then shipping to the healthcare facility.

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Ryan Hess
Director, Innovation and Strategy, Additive Manufacturing
Ricoh USA, Inc.

A winning collaboration and shared vision

In reviewing the partnership, Ricoh USA executives give Merative high marks. The collaboration helped to jump-start Ricoh USA's entry into 3D for healthcare with a credible and powerful solution. Development took less than a year from start to finish, even though it overlapped with COVID-19 lockdowns. And the interactive 3D printing functionality and workflow added to iConnect Access are likely to win acceptance by medical professionals already reliant on the tool.

"Ricoch and Merative have a direct commonality of vision, working together to move the automation of today into ever higher functionality," says Hess. "That's going to break open the democratization of access to 3D printing in healthcare."

To help publicize the new service, Merative is co-marketing the solution with Ricoh USA in print and in person. Representatives of both companies attend trade shows and serve at booths to demo iConnect Access and the 3D printing service.

"Getting into medical device manufacturing is a new endeavor for Ricoh," says Turner. "The benefit of a partnership with Merative is its deep understanding of what we were trying to do. Overall, the experience with Merative is one of the best experiences we've had with a business partner."

Hess concurs, noting his appreciation for the collaboration and cooperation from the Merative imaging team. "We appreciate their vision of seeing how this can improve society and following it," he says. "We walk in lockstep to try to achieve that, and when there are barriers, our mission to improve lives helps push through them. It's been a great journey."





About Ricoh USA, Inc.

Headquartered in Exton, Pennsylvania Ricoh USA (external link) is an information management and digital services company. It is a leading provider of print and imaging solutions designed to support digital transformation and optimize business performance. Ricoh USA is part of Tokyo-based Ricoh Group, which reported worldwide sales of around USD 15.1 billion in 2021.

Learn how you can benefit

Merge provides award-winning enterprise imaging solutions for radiology, cardiology and orthopedics, using vendor neutral cloud and AI technologies to reduce workspace complexity and create seamless workflows.

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About Merative

Merative is a data, analytics and technology partner for the health industry, including providers, payers, life sciences companies and governments. With trusted technology and human expertise, Merative works with clients to drive real progress. Merative helps clients orient information and insights around the people they serve to improve decision-making and performance. Merative, formerly IBM Watson Health, became a new standalone company as part of Francisco Partners in 2022. Learn more at www.merative.com.

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