Today's large-format printers are offering contractors an affordable way to save time and even win new work. This article illustrates how, for less than $10,000, AEC professionals can own a multifunction large-format printer and produce high-quality scans, drawings, and compelling visualizations efficiently and cost-effectively.

Contractors Get an Edge with In-House Large-Format Printing

by Heather Livingston

Canon imagePROGRAF large format MFPs, available for less than $10,000, help save valuable time and money and reduce errors — and produce stunning visuals that can help win projects.

Numerous efficiencies have been realized in recent years in the architecture, engineering, and construction (AEC) fields through the rapid expansion of digital design and building information modeling (BIM). More detailed and defined modeling has led to a higher degree of coordination and information sharing among project team members. Architects and engineers in particular have reaped many benefits from this digital sea change as they have been able to provide their clients with visually stunning graphic renderings that convey design intent with new clarity while significantly reducing design time and costs. Unfortunately, in some cases, the efficiencies gained by the design team translate to increased costs for general contractors and subcontractors. One example is large-format printing.

As they always have, building project owners release RFPs for bids from contractors and subcontractors. What's changed now is that today's project specifications are distributed as digital documents rather than large-format paper drawings, and it's up to contractors to print the documents for review and estimation. Because contractors and subcontractors must be able to view these designs in minute detail, they frequently send the files to reprographics firms or other service bureaus for printing.

Not only must contractors absorb these new costs, they also must account for the extra time needed to obtain the printing from an outside service. When printing lags make deadlines hard to meet, they may lose business opportunities or gain a reputation for slow delivery. Many general contractors and subcontractors are finding that the additional cost, time, and effort required to outsource large-format printing is prohibitive. As such, they are beginning to recognize the benefit of owning a large-format printer.

Designed and built for AEC firms, GIS professionals, and other technical document users, large-format printers address the unique printing requirements for the AEC industry's CAD-based drawings and renderings. Large-format printers were designed for reproducing not only architectural and engineering plans, but also corollary documents including parts diagrams, workflow diagrams, solids models, facilities management plans, zoning diagrams, foot traffic plans, site surveys, and development plans.

CANON LARGE FORMAT IMAGEPROGRAF MFP SERIES

Canon, a long-time leader in imaging technology, steps into this scenario with its imagePROGRAF series multi-function printers (MFP), which provide affordable, all-in-one, copy-file-share solutions for today's busy contractors. Each imagePROGRAF MFP large-format solution includes all the hardware and software needed to support a complete copy-file-share workflow:

- **Choice of printer,** according to your needs for document size, RAM, and hard drive capacity.

- **Color scanner,** which offers outstanding image accuracy and a high level of detail — and can save files directly from the MFP workstation in PDF, JPG, and TIFF formats.

- **22" touch-screen monitor** that allows users to preview and edit files without leaving the MFP.

- **MFP stand** that can be positioned for optimal functionality and user comfort and is designed to occupy minimal floor space.

- **SmartWorks MFP software** that delivers dynamic file preview and a large, intuitive interface — and can print PDF files directly.

Canon imagePROGRAF Large Format iPF MFP Series printers, including this Canon iPF765 MFP 40 ($8,995), integrate SmartWorks MFP software and a 22" monitor that deliver a large, clear, intuitive interface that allows even novice users to easily preview, copy, scan, print, file, and share documents.

- **Canon Direct Print & Share software,** a cloud-based solution enabling users to scan and upload documents to their own personal cloud and access those documents from any computer, tablet, or smart phone.

In all, the imagePROGRAF series MFPs are fast and effective tools for AEC professionals needing to print, copy, or save drawings, renderings, maps, plans, proofs, posters, and more.

Research conducted by InfoTrends, an international consulting company that specializes in research and strategy for managing technology documents, reveals that AEC firms' priorities for CAD-related issues are

- increased productivity;

- reduced errors;

- faster document creation, coupled with better document sharing and management;
- improved efficiency; and
- reduced costs of document creation and management.

To address the needs of all its AEC clients, Canon has created five specialized large-format MFP systems.

INCREASED PRODUCTIVITY

Stantec is a Canada-based planning, engineering, architecture, project management, and environmental services provider with more than 13,000 employees in more than 200 locations. For Tracy Black, office administrator in the Reno, Nevada, office, rapid print speed and large memory capacity were two primary reasons her office purchased an imagePROGRAF iPF765 MFP M40 system last year. The office's previous large-format printer was a few years old but already outdated in its capability to handle complex design files and graphics.

"The memory on them was very low," recalls Black. "The bigger files that we

Environment	Model	Size	RAM	Hard Drive
Personal	iPF750	36"	256 MB	
Workgroup	iPF765 / 760	36"	256 MB	250 GB*
Production	iPF825 / 815	44"	384 MB	160 GB

*iPF765 only

THE HENSEL PHELPS OFFICE HAS MADE EVERY EFFORT TO BECOME FULLY DIGITIZED. … YET THEY STILL FIND THE LARGE-FORMAT PRINTER TO BE **A NECESSARY AND VALUABLE OFFICE TOOL**.

have now, when you send them to the [previous] printer, it takes forever for them to load. This loads really quickly. That was what persuaded us to get something like this: speed and less down time for the person that's doing the printing."

The imagePROGRAF series was designed for the high-speed throughput and workflow solutions critical for architecture, engineering, and construction firms. The print speed is measurably increased with Canon's proprietary large-format printer common architecture (L-COA) platform; for example, the imagePROGRAF iPF765 MFP M40 printer can produce an A1 drawing in 30 seconds and deliver up to 733 ft^2 of renderings in an hour.

REDUCED ERRORS

Trent Carney, office engineer at Hensel Phelps Construction in Austin, Texas, says the company's former large-format printer was "a dinosaur." One of the largest construction management firms in the United States, Hensel Phelps oversees projects spanning the fields of aviation, education, health care, hospitality, manufacturing, justice, research, multi-residence, museum, transportation, and others. According to Carney, Hensel Phelps purchased its Canon large-format MFP specifically for its work on the John Sealy Hospital, University of Texas Medical Branch, in Galveston.

As architectural rendering technology advanced, detailed printouts from the original printer became increasingly difficult to read, making costly job-site errors more likely. Having a printer that could deliver accurate line definition in the plans, drawings, and schematics was key when communicating design details to the builders.

"The big idea was to go get this thing so we could print out coordinated model stuff to help communicate that to superintendents and foremen and field guys and owners," says Carney. "We shopped around for several different kinds. [The Canon imagePROGRAF MFP system] probably fit the most as far as what it can handle, the type of output it will do, and the quality."

Hensel Phelps' previous printer did just that — print, in black-and-white only — which meant that when workers needed to scan large-format drawings or print large-scale graphics in color, they had to outsource to a reprographics company, costing them time and money. The Canon imagePROGRAF MFP system prints, copies, and scans in one location. Plus, it helps avoid unnecessary errors and costly reprints through its real-time preview function that enables users to change settings even after clicking Print.

Initially, Carney says, his office used the large-format printer to print full-size sheets of plans to disburse among subcontractors. More recently,

the office has made every effort to become fully digitized, though the staff does sometimes print drawings for smaller subcontractors. Yet they still find the large-format printer to be a necessary and valuable office tool. At the Galveston site, the design and construction team holds weekly "show-and-tell" meetings, where it uses printouts to review the latest drawings and specifications with project owners.

"Every week in our owner's meeting, they walk through it to show where we're at with structure, with build-out, with MEP," explains Carney. Printouts are used mainly as communications tools, for "effectively portraying our job site production and how we're meeting schedule and safety, with showing access routes and lay-down plans. That way it's clearly communicated to the entire job site," he says. "It's just a better way for them to understand it so they can go communicate it to their people out in the field."

Carney also has come to appreciate the MFP's 22" monitor, which is much larger than those that come standard on competing models. "Since we've had the machine," he explains, "I find that the larger, touch-screen monitor is very helpful for new users. It has Windows 7, so the learning curve is almost nonexistent. Anyone who

hasn't used the machine before can pretty much figure out how to print, copy, or scan easily."

And he values the system's native ability to print PDFs, which is unique in the market. "Since we are a 100% electronic drawing construction project, 98% of what we print is in PDF format."

Minor errors in measurements, line density, and placement can cause costly construction errors, but teams can confidently rely on the imagePROGRAF MFP system to accurately relay important visual information. The imagePROGRAF MFP printers have high-density print heads designed specifically to mitigate line blurring and bleeding, plus a five-color reactive ink system that draws on four color-fast dyes to produce brilliant color. To deliver print resolution of 2400 x 1200 dpi and line accuracy of +/- .10%, the imagePROGRAF MFP printers use 4-picoliter droplets of ink delivered through 5,120 matte-black nozzles, thereby producing thin lines, small fonts, and precise details that are crisp and clear — even on low-quality colored papers.

FAST DOCUMENT CREATION AND SHARING

As the sophistication of CAD models and renderings has increased, so

With vibrant color and clarity, large-format prints produced by Canon imagePROGRAF Series multifunction printers can present concepts in a way that is difficult to match using digital tools.

has the expectation that printers will be able to reproduce those images with finesse and speed. Previous large-format printers often had very little on-board memory, if any, which resulted in lengthy print times and caused delays and errors in document management because files couldn't be saved directly from the printer workstation.

Stantec's Black says that Canon's on-board computer, paired with its ability to print, e-mail, scan, and save

directly from the printer workstation, delivers "great quality for the price."

"We did not have the capabilities of scanning to color prior to getting the Canon," Black explains, so the office sent those files out to reprographics vendors. "We don't have to send things out anymore … and that was a big deal for a really long time — scanning to file and getting digital files to our clients quickly."

At Hensel Phelps, Carney explains, "The main reason we got the Canon up front was because we're heavily

involved in BIM coordination." The big idea, he says, was to get a large-format printer that could coordinate 3D modeling needs among the design team but also help communicate that information to the owner, superintendents, foreman, subcontractors, and others in the field.

The built-in 250-GB hard drive of the Canon imagePROGRAF iPF765 MFP M40 makes it ideal for BIM workgroups that need to print file sets from various workstations. Multiple users can share the printer without worrying about workflow bottlenecks, leading to improved and streamlined work processes.

However, with more than one user accessing the print queue and processing files, it becomes critical to maintain document security. To meet that need, an interface lock system provides administrative control and limits access to the printer and stored files. It also supports password-protected inboxes to keep print jobs and documents organized.

IMPROVED EFFICIENCY

The imagePROGRAF MFP series provides a helpful layout function that enables users to assemble charts, tables, text documents, and graphics of varying file formats and merge them onto a single page to create high-

FASTER PRINT SPEED AND POWERFUL MEMORY EQUATES TO FEWER HOURS DEDICATED TO BABYSITTING THE PRINT JOB, AND **EVERY PERSON ON STAFF CAN USE THE PRINTER WITH MINIMAL TRAINING.**

impact graphics and presentations. For PCs, it also offers a plug-in for Microsoft Office to easily print large-format documents or graphics created in the Office environment.

Other time-saving features of the imagePROGRAF MFP printer series include a redesigned front-loading media basket that holds 20 sheets measuring 24" x 36", a precision print head with 15,360 ink delivery nozzles, a sub-ink tank system that allows users to change ink on the fly without interrupting print jobs, and the internal hard drive that allows users to save print jobs for future reprinting, quickly process large files, and track file information on as many as 500 print jobs. For Stantec, Black says that the combination of faster print speed and powerful memory equates to fewer employee hours dedicated to babysitting the print job, and the

intuitive design and interfaces means that every person on staff can use it with minimal training.

The fast print speed of the imagePROGRAF MFPs facilitates the production of eye-catching visual elements for project proposals, thus improving the odds of winning projects. Carney says that he's heard anecdotally from Hensel Phelps clients that the high quality of visual materials produced on Canon large-format printers are helping to win bids.

Project owners appreciate the high-quality visuals at the weekly "show-and-tell" presentations as well, Carney relates: "It's been communicated to us how beneficial it is to have that up on the walls. It's pretty above average for a construction job site trailer. Our competitors don't use
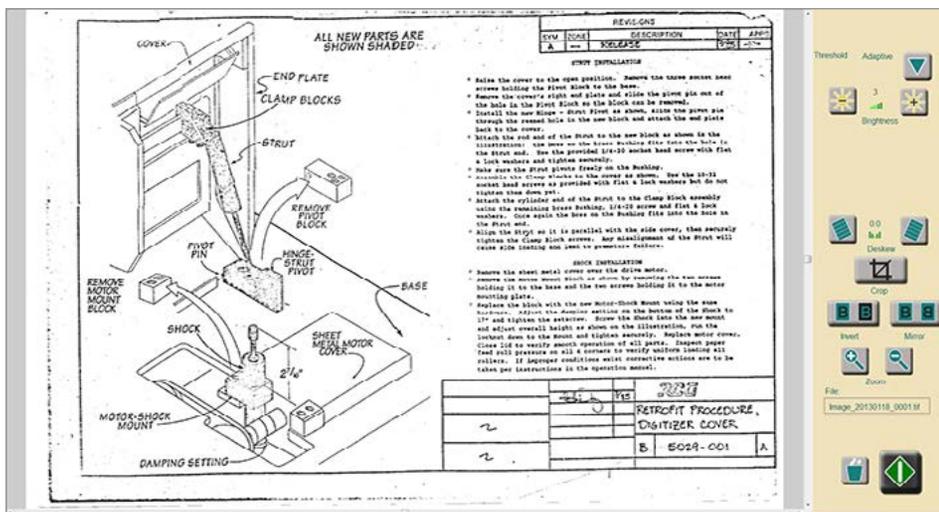
anything near that nice. Owners notice it. They like it."

REDUCED COSTS

All AEC professionals are extremely busy and continually have to provide more from less, but perhaps none more so than contractors and subcontractors. Having a large-format printer that can scan, print, and e-mail documents to clients and vendors can help save money and time that otherwise would be spent off-site and funneled to reprographics. Having a dedicated printer in the construction office or job-site trailer also means that contractors now have control over their documents and can access them instantly, day or night.

To toe the line on job costs, Canon's imagePROGRAF MFP series offers an Accounting Manager tool to track and manage how much ink and media is used for each print job and how long each job takes to complete. Costs can be assigned to ink and paper by the contractor to determine the cost of materials, and users can input a variable cost that easily can be added to the total print cost. Those numbers then can be exported to Microsoft Excel for billing processing.

For further cost savings, the printers offer an Economy mode for printing

Users can view fine details in a scanned document using the integrated SmartWorks MFP software and 22" monitor.

less-detailed graphics, which can help reduce ink consumption and costs.

MULTIFUNCTION DESIGN

In addition to needing a large-format printer that is capable of handling today's large CAD files, many AEC professionals now are realizing the usefulness of the imagePROGRAF MFP series for other print services such as full-color copies, reports, and graphic presentations, making it doubly valuable to time and cost-conscious firms. The need to communicate design

ideas, present 3D CAD renderings to owners, and build project consensus among stakeholders has resulted in the fusion of technical document and graphical presentation printing. Full-color, oversized drawings, sketches, and photographs now are used side by side with technical documents to help AEC professionals effectively present their ideas and concepts with visual appeal and technical accuracy.

Black relates that Stantec's Reno office uses the imagePROGRAF iPF765 MFP M40 printer to produce design

drawings, presentation graphics, and marketing materials. "It keeps us up to speed," she believes. "In our marketing field, to be able to ... print graphics and mount them on a board and then do presentations off of that [is] very, very nice. [It keeps us] competitive with the industry."

Adds Carney, "We use the printer mainly for communication — and on a successful construction site, communication is key." He fully expects that Hensel Phelps will achieve its return on investment before the new Sealy Hospital is operational. What's more, he intends to specify a Canon image-PROGRAF MFP large-format printer on all future projects due to its ease of use, convenience, and cost savings.

"We're a pretty big outfit and we have several districts across the United States," Carney explains. "I will be going for one on each of my future projects," he says, if for no other reason that to be able to print invaluable communication tools at the drop of a hat — adding that the effort involved in outsourcing to a reprographics company and waiting for delivery just isn't convenient nor is it conducive

to fostering a competitive business environment.

"In the simple sense of convenience, it is well worth it," he concludes.

Black concurs. "The main thing for us is the speed of it. It's very quick in printing out multiple documents in a timely manner. It's a very quick machine, so we're very happy with that." ◆

For more information about Canon image-PROGRAF MFP series multifunction printers, visit the Canon web site.

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