



**Rockwell
Automation**

Do it better **digitally**

How people can work smarter,
faster and better in a digital environment



FactoryTalk

by ROCKWELL AUTOMATION

Redefine work in a digital space

Expand what's possible in your business when you **transport your people, products and processes into the digital world.**

- **Design** can take place in a digital sandbox. Here, engineers can digitally build a machine and put it through its paces before they order parts or cut steel. And they can commission machines faster, more consistently and with less risk of last-minute surprises.
- **Operations** can be improved right from the get-go. Operators can be better trained for their jobs in a virtual environment, where any scenario can be simulated, and mistakes can happen without consequence. Once production starts, plant personnel can use data streams from smart systems to endlessly scrutinize and improve production.
- **Maintenance** can be reimaged to take downtime to new lows. Better insights and digital simulations can help technicians respond to issues and recover from them faster. And predictive insights can help workers uncover and resolve downtime issues before they happen.

Before you get started

You've probably heard about concepts like digital twin and digital thread. But what do they mean?

DIGITAL THREAD

The digital trail of data created by a digital twin across an asset's lifecycle. This data can be turned into easy-to-understand insights to inform people how the asset is performing or will perform.

DIGITAL TWIN

A digital replica of an asset – like a product, machine or plant. This replica is “living,” which means it changes as the asset is developed, operated and maintained. It also can be viewed on a screen or in an immersive 3D environment to improve processes like design, training and maintenance.

Redefine
work in a
digital space
PG 2

**Before you
get started
PG 3**

Find your
digital sweet
spot
PG 4

Designing &
prototyping
PG 5

Commissioning
PG 6

Training
PG 7

Operations
PG 8

Maintenance
PG 10

A better way
to work
PG 11

Find your digital sweet spot

Digital engineering isn't an all-or-nothing strategy. You don't need to replace the tools that your workers know and like today. Instead, you can extend those tools digitally to improve how designers, production managers, technicians and others work.

You just need to review your business and determine where you can do things smarter, faster or better using a digital approach.

To help you do this, let's review the five key areas where digital engineering can improve your business:

- 1 DESIGN AND PROTOTYPING
- 2 COMMISSIONING
- 3 OPERATOR TRAINING
- 4 PRODUCTION
- 5 MAINTENANCE

"Prior to getting so deeply into simulation, we used to do a lot of physical testing to demonstrate to a customer that an equipment or process Intralox designed was going to work. But more and more, you get into processes where the permutations are so great, it's impossible to undertake physical testing."

- Joe Depaso, Senior Staff Engineer, Intralox

Redefine
work in a
digital space
PG 2

Before you
get started
PG 3

**Find your
digital sweet
spot
PG 4**

Designing &
prototyping
PG 5

Commissioning
PG 6

Training
PG 7

Operations
PG 8

Maintenance
PG 10

A better way
to work
PG 11



AVOIDING SETBACKS IN A NEW FACTORY

For one company, using simulation software to optimize its new 250,000-square-foot mass timber factory was a “no-brainer” decision given what was at stake.

“If you need to buy more equipment after your line is up and running, the lead time can be nine months to two years,” the company’s lead simulation engineer said. “Even moving equipment around can be expensive. And if you can’t produce to the stated capacity of your business model, then your cost per unit skyrockets and the facility becomes unprofitable.”

1 Design and prototyping

When you can build, test and prove machine designs digitally – while pencil is still on paper – you can change what’s possible in your business.

Virtual design and prototyping can help you:

- Get machines to market faster
- Reduce risk in your designs
- Create higher-caliber, more customized machines

With simulation software, you can apply physics to your 3D CAD model to bring it to life. Watch it run and see how it interacts with people or with other machines.

You can even bring the model into a VR environment, observing it from a plant-floor view. What if you could stand in front of your HMI on the floor before you even build? Imagine how much time you could save if you could operate your system before the design was finalized.

Need to make changes? Make them in your digital design with just a few clicks rather than buying parts and spending days of labor to build a new prototype. You can even emulate programmable logic controllers. FactoryTalk® Logix Echo, with its new workflows, can help you move from design to test in an instant. Expand the horizons of how you test and design, with broader connection to the digital world.

And it’s not just digital twins that can help you get machines to market faster. Reusable code allows you to build off the success of existing machines without redesigning from scratch.

Think big – beyond programming controls. The rise of simulation software means that almost anything can be digitally modeled. For instance, if you create a behavioral model of a turbine or a pumping station, Studio 5000® Simulation Interface can connect that model directly to your running Logix code. Run your program with simulation-driven tag values that allows you to recreate what your program will face in the real world.

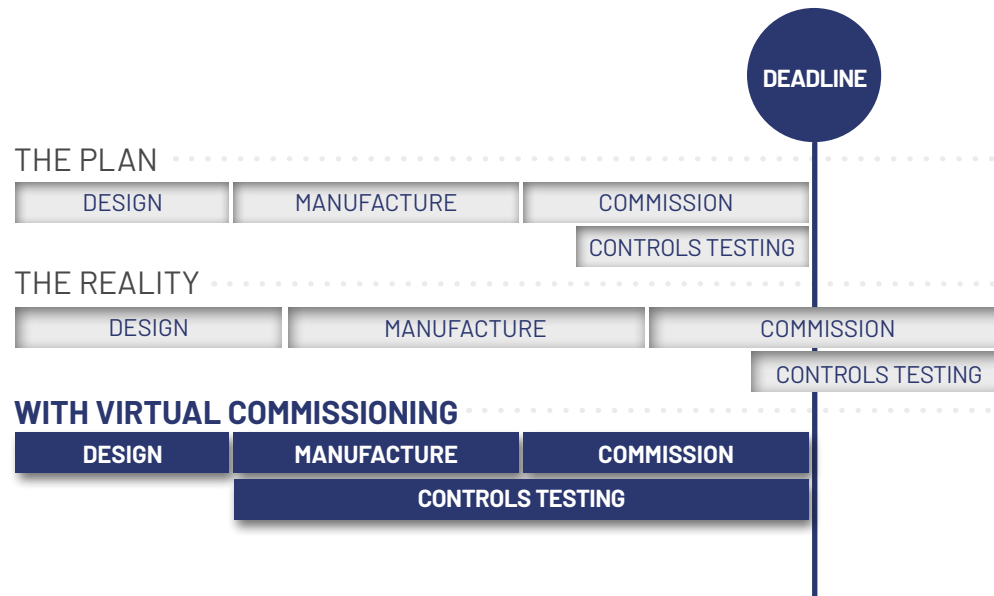
2 Commissioning

Waiting until you bring a machine on-site to perform controls testing is flirting with disaster. You don't know if your machine and its control system are aligned until you're standing next to your customer, with their start-up deadline approaching.

You may discover that your machine operates below expectations or doesn't meet the spec. And fixing these issues at the last minute can be expensive and lead to missed start-up deadlines — and possibly strained relationships.

Virtual commissioning can help you put an end to these problems.

By creating a dynamic digital twin of both your machine design and the real operational logic of the control system, you can uncover issues earlier in the design phase — long before you bolt your machine into the floor of a customer's plant. You can exhaustively verify and demonstrate the operation of your machine and the controller, before any resources are committed to them.



FROM MONTHS TO WEEKS

Daifuku Webb uses simulation software to test the PLC code for its material handling systems in-house, before they go to the field. In one airport project, this led to significant cost savings.

"Ordinarily, our people spend many months in the field," said Greg Swisher, senior controls engineer, Daifuku Webb. "And we were able to condense that time down to about a three-week period from the time our engineers hit the field to the time the customer took acceptance."



GAME ON

As seasoned workers retire and a new generation takes their place, virtual training can help workers learn their jobs in a more familiar way. They can use devices like tablets and VR headsets that they have at home. And training can be enhanced in a virtual environment to gamify learning.



3 Training

You don't need to wait until both machines and operators are on site together to start training.

With virtual training, you can use a digital twin to train workers before a machine arrives. By either sliding on a VR headset or working from a screen, workers can build skills and competency in a safe and immersive virtual environment.

Perhaps the greatest benefit of virtual training is the freedom it gives you.

Anytime, anywhere training

You don't need to send workers to a training site or wait for equipment to become available. Instead, you can provide training to whoever needs it, whenever they need it, wherever they need it.

Learning without limits

Virtual training doesn't have the same restrictions as real-world training. Workers can learn how to keep production running in ideal operations. And they can be put to the test with simulated faults and extreme conditions that may not be possible to physically replicate. This can better prepare them for responding to similar incidents in production and ultimately reduce downtime.

Growing from mistakes

Workers can be free to make mistakes in virtual training without worrying about disrupting production. If an operator does something wrong, that action can be recorded for remediation purposes. And they can be required to prove their competency in training before they experience live production.

Redefine
work in a
digital space
PG 2

Before you
get started
PG 3

Find your
digital sweet
spot
PG 4

Designing &
prototyping
PG 5

Commissioning
PG 6

**Training
PG 7**

Operations
PG 8

Maintenance
PG 10

A better way
to work
PG 11

4 Operations

The value of digital engineering doesn't stop after machines are commissioned and operators are trained.

Once production starts, digital twins can mimic processes, machines and controls to help plant personnel learn about operations and experiment with changes. And an ever-growing digital thread of information can reveal insights into how production can be improved.

Operations of all types can reach new heights when they can:

- **Continuously drive improvements** in production and adjust on the fly using insights from your digital thread.
- **Trial line startups and production scheduling and sequencing** to optimize product mixes and volumes.
- **Experiment with machine configurations** to improve quality, reliability and throughput.
- **Detect anomalies in processes** to uncover operational issues before they impact quality and cause scrap or downtime.
- **Test run new products or machines** to optimize throughput and avoid problems like downstream bottlenecks.
- **Fly through virtual recreations** of large operations like mines to look and listen for equipment issues rather than physically traversing the operations.
- **Create a virtual sensor** to estimate a value that may otherwise require expensive instruments or manual readings to determine.





A GLOBAL MANUFACTURER implemented a digital thread alongside its MES and saw a 50% lead time reduction to customers, a 50% reduction in defective parts and a 4% improvement in productivity.

A LARGE MULTINATIONAL COMPANY used a digital twin to virtually test production scenarios, saving millions of dollars with the same equipment.

A FOOD MANUFACTURER used a digital twin to test and validate a facility upgrade prior to implementation. This helped the company achieve 80% less downtime and a more than 10% throughput increase.

“As industrial organizations manage transitioning workforces, predictive analytics solutions can help ensure maintenance decisions and processes are captured and repeatable by incoming personnel.”

– ARC Advisory Group, Digital Twins Roadmap:
From Reactive to Prescriptive Maintenance



5 Maintenance

Maintenance teams can fight downtime like never before using digital simulations and real-time (or even predictive) insights.

Respond faster

Data flowing through a digital thread can help technicians detect problems as they happen, to prevent or minimize downtime. This includes health and diagnostic data from control system devices that can notify technicians when maintenance is needed. But it also includes network data, for example, from switch-level alarms, which today is just as critical to uptime.

Predict more

In an ideal world, maintenance teams would never need to respond to downtime events because they could predict them. This is increasingly possible thanks to the use of predictive analytics. These analytics use machine learning and artificial intelligence to learn your operations, identify machine issues early and alert technicians of those issues. Technicians can then schedule maintenance during a planned downtime.

Recover sooner

Digital twins can help you improve MTTR in a couple key ways. First, virtual training allows technicians to prepare for downtime problems in advance rather than troubleshooting them the first time they happen. And when problems do happen, technicians can use AR technology to overlay digital diagnostics or work instructions on a physical machine to diagnose and fix problems faster.

A better way to work

When it comes to digital engineering, don't think about what needs to change in your business. Think about what can be improved to make you more competitive. Then, you can deploy the digital solution that helps you realize that improvement, without disrupting how you work today.

To learn more about how digital engineering can transform your operations, contact a Rockwell Automation sales representative or **click here**.

Connect with us.    

rockwellautomation.com — expanding **human possibility**[®]

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

ASIA PACIFIC: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Expanding human possibility and FactoryTalk are trademarks of Rockwell Automation, Inc.

Trademarks not belonging to Rockwell Automation are property of their respective companies.

Publication FTALK-BR013B-EN-P - July 2021 | Supersedes Publication FTALK-BR013A-EN-P - March 2020

Copyright © 2021 Rockwell Automation, Inc. All Rights Reserved. Printed in USA.