THE
DESIGN GRIDLOCK
MANIFESTO

*6 Ways Old CAD Technology
Slows Your Company Down
(And What You Can Do About It)*

"I forgot to save."

"But it crashed and the data is gone!"

"I forgot to back up."

"Did you see my email?"

"The file got corrupted. Starting over."

"That file is checked out."

"Where's the latest version?"

"I thought you had it."

Onshape

"The assembly blew up!"

Onshape

Ever Feel Stuck?

Even if you are the most talented driver in the world, your skills are useless in a rush-hour traffic jam.

Similarly, the most talented design team in the world can't use their design skills during periods of Design Gridlock.

Fortunately, getting stuck in Design Gridlock is now preventable...

Onshape

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What is DESIGN GRIDLOCK?

Design Gridlock is an unavoidable set of productivity-draining problems that slow companies down at the most inopportune times. As the pressure for more speed and innovation in product development continues to increase, engineers and manufacturers who are using old file-based CAD systems are too frequently forced to either stop working or take a few steps backward.

When does momentum come to a screeching halt?

▸ *When engineers are forced to wait for co-workers to check in design files before they can make edits.*

▸ *When engineers have to recreate lost work due to CAD crashes and corrupted files.*

▸ *When teams are frozen by the confusion of multiple file copies, wondering "which version is really the final version of our design?"*

Furthermore, if new design team members are hired for a project, they may have to wait days or weeks to purchase additional CAD licenses, depending on the responsiveness of the Value-Added Reseller (VAR). Or if your external partners are using an earlier version of the same CAD software, they are forced to upgrade before they can even read your files.

Had enough? Oh, this is just the beginning.

Even if you are the most talented driver in the world, your skills are useless in a rush-hour traffic jam. Similarly, the most talented design team in the world can't use their design skills during periods of Design Gridlock.

The bad news for motorists is that commuter traffic is only getting worse.

The good news for CAD users? Getting stuck in Design Gridlock is now preventable. Engineers no longer have to passively accept these problems as the cost of doing business.

"Did you see my email?"

"I thought you had it."

"Where's the latest version?"

"I forgot to back up."

"That file is checked out."

Who Suffers From Design Gridlock?

If you've overheard any of these comments in your office or on the shop floor, your company unfortunately has a gridlock problem.

"I don't know. Call IT."

"The assembly blew up!"

"The file got corrupted. Starting over."

"I forgot to save."

"But it crashed and the data is gone!"

"We're still waiting for design feedback."

"But we're on 2016."

"Shenzhen built an old version of that part."

"Anyone got a license code?"

"Who made those changes?"

What is Design Gridlock Really Costing You?

"The consequences of using the wrong file, machining the wrong part and sending that wrong part to a customer is more than just losing thousands of dollars. In the bigger scope of things, there's no room for being late in our market. These power plants have to run and people need electricity – so the parts need to be right the first time and they need to be on time."

– **Jason Kammer,** Engineering Manager at **Cutsforth**, which manufactures brush holders and shaft grounding systems for some of the world's largest power companies.

Mistakes happen. When it's human error, you learn from those mistakes and move on. But when it's old technology leading to inaccuracies or delays, it's tougher to forgive.

In the early days of commercial CAD, more than four decades ago, one seat of CAD could easily cost hundreds of thousands of dollars. You had no choice but to buy the computer, the software and even the desk as one turnkey system. At the same time, engineers were paid a fraction of what they are paid today (even when factoring inflation). It sounds surreal now, but companies used to have one super expensive computer surrounded by lots of relatively "cheap" engineers!

Today, it's the exact opposite: Each highly paid engineer is now surrounded by lots of relatively cheap computers (laptops, desktops, tablets and phones) and comparatively inexpensive software.

Given that equation, how much time do you want your engineers focused on their designs versus worrying about software issues?

Onshape
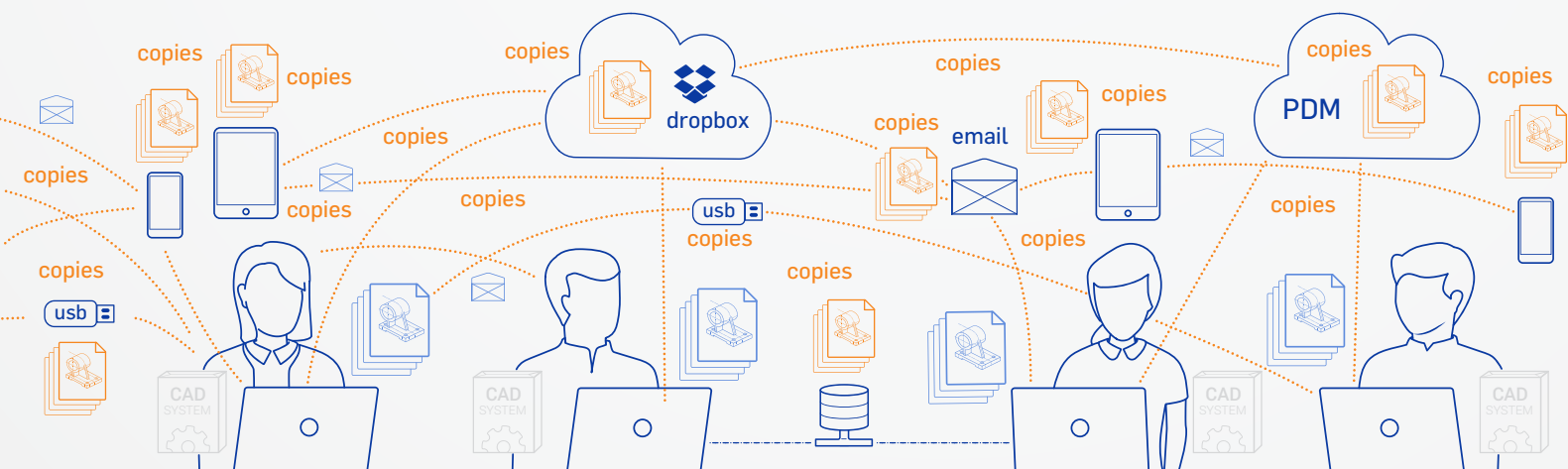
Design Software Used at Different Airbus Factories Wasn't Compatible

Airbus Debacle Worsens: New A380 Delays to Cost Billions

FACTORY, DESIGN FLAWS CAUSED A380 CRACKS

BOEING 787'S PROBLEMS BLAMED ON OUTSOURCING, LACK OF OVERSIGHT

Delays Stall Delivery of Airbus A380s Again

⚑ What is Design Gridlock Really Costing You?

Design Gridlock doesn't discriminate.

It has paralyzed the world's biggest companies and can heartlessly trip up startups at the earliest stages. Two of the more famous examples of Design Gridlock wreaked havoc with the biggest rivals in the aircraft industry. The double-decker Airbus A380 superjumbo jet, the world's largest passenger plane, began its development with massive production delays because different factories were using incompatible design software.

Similarly, one of the many reasons the Boeing 787 Dreamliner went billions of dollars over budget and fell years behind schedule was because its 17 design teams in 10 countries had problems communicating effectively.

But you don't need to be working at a multinational corporation to deal with these massive headaches.

Let's take a closer look at some of the more common symptoms of Design Gridlock – and how some forward-thinking companies are using Onshape's modern CAD system to eliminate them!

A Nightmare Delay for the Boeing 787 Dreamliner

Virgin Atlantic Pushes Back Airbus A380 Delivery

BOEING'S 787 DREAMLINER: A LEGACY OF DELAYS

The 787's Problems Run Deeper Than Outsourcing

Onshape

6 Ways Old CAD Technology Slows Companies Down

- ◤ Confusing Data Management: Which Version is the Latest Version?

- ◤ Lost Work: CAD Crashes & File Corruption

- ◤ Restricted Access to Your CAD System

- ◤ Software Incompatibility and Forced CAD Upgrades

- ◤ Blocked Communication and Collaboration

- ◤ Inadequate Customer Support

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Confusing Data Management:
Which Version is the Latest Version?

THE PROBLEM:

With old file-based systems, CAD data is usually edited by multiple people in multiple places. Particularly with large assemblies, there are lots of files to keep track of. You save a version, make some changes and rename the file. Copies are emailed to colleagues and get copied everywhere. There's never really a way to know if you truly have the latest version.

Some design teams rely on naming conventions like Part1-v1, Part1-v2, etc. and then settle on a "final" name when they're done. Something like "Assembly4-Final." Until a last minute change needs to be made and then what do you call it? The "Assembly4-Final-Really-Final"?

Complicating matters further, changing the names of files as their contents change can cause big problems in an assembly because file names are used as references. Nobody likes broken assemblies. Nobody.

Even if you use a complex and expensive PDM system – requiring engineers to check-in and check-out files like they are in a library or bank vault – all you can see is the latest data that is in the vault. There's absolutely no way to know if someone else has a copy outside of it. Maybe they've followed procedure with the PDM system and put a lock on the file. Or maybe they haven't.

If they have checked out the file, you have to wonder if they've changed it since they checked out. If they have changed it, that's the latest version. Is the PDM system up to date? Nobody knows because the PDM vault doesn't update in real time. It only updates when people go through the trouble of updating it.

Manufacturing the wrong version of a design is an expensive proposition. Knowing which version of your work is the final one shouldn't be a guessing game.

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Confusing Data Management:
## Which Version is the Latest Version?

THE SOLUTION:

With modern CAD, it's easy to find the latest version because there's only one place to look for it. Because CAD data in Onshape is never copied as files, but is instead stored in one central database in the cloud, it updates in real time as your team members edit.

There's also no need for any PDM system servers, installs, licenses or backups because Onshape includes built-in version control. For modern CAD users, the "Where's the Latest Version?" problem is no longer a problem.

How Companies Are Eliminating Data Management Chaos
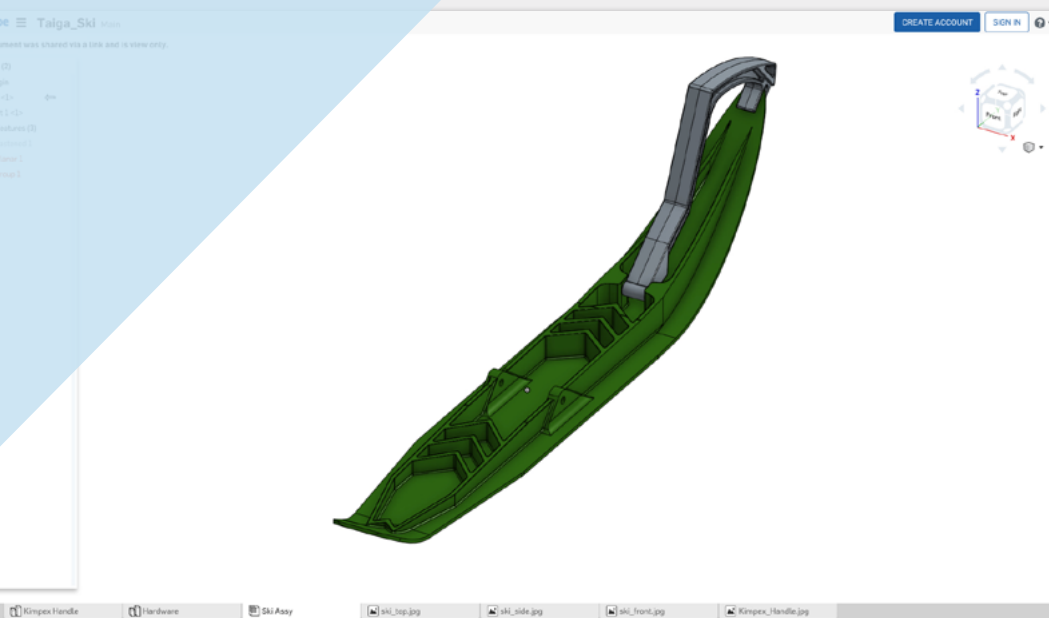
Based in Quebec, Canada, Taiga Motors is now developing the "world's quietest snowmobile," an eco-friendly electric vehicle that matches the power and performance of a combustion engine snowmobile.

When Taiga Motors needed to increase their design team by a factor of 10, one of their immediate tasks was choosing a CAD system: Do they buy 9 more seats of their current system or evaluate alternatives? One of the key reasons the company chose Onshape was its built-in data management.

"If we were using SOLIDWORKS® or Autodesk®, we'd be using some kind of PDM system for version control to make sure people aren't editing parts over each other," says Taiga Motors co-founder Paul Achard. "From my experience, that's just a huge pain to deal with and a serious investment in time."

"With Onshape, since it's all cloud-based and there's only one version of your design kept in one place, everything is easy to find," he adds. "Unlike with my previous CAD system, if I want to find a part, I can just search it in the search box. It finds it immediately. It doesn't find 7,000 different versions of the part. I know exactly which one is current, which one's up to date."

"We like to think of ourselves as a pioneer in our field, but we also want to be a pioneer in the way that tech startups function nowadays. I like working with a company that's trying to do CAD the way it should be done in the year 2020, as opposed to how it was imagined in 1990."

"I've gone from a scenario where I really had to think about file management every time I used CAD, to it being a non-issue," Achard says. "And so now I can just move on to something else in my life."
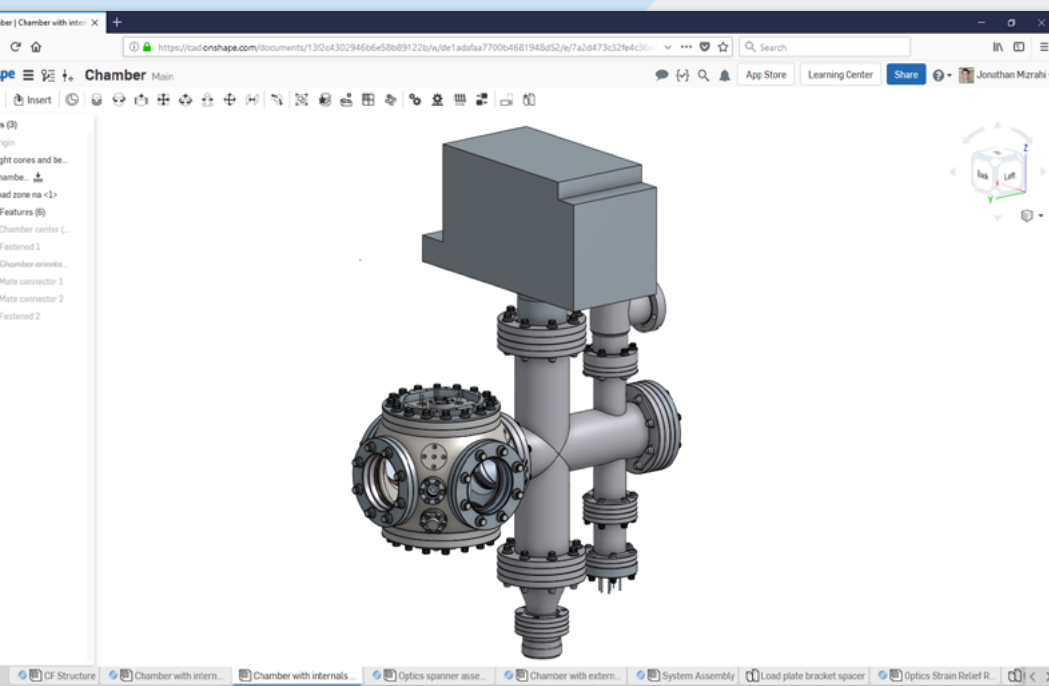
Based in College Park, Maryland, IonQ is building the world's first fully-expressive, full-stack quantum computer based on trapped ion technology. Quantum computing is poised to reshape medicine, materials, simulation and other industries. Pictured above is a vacuum chamber assembly.

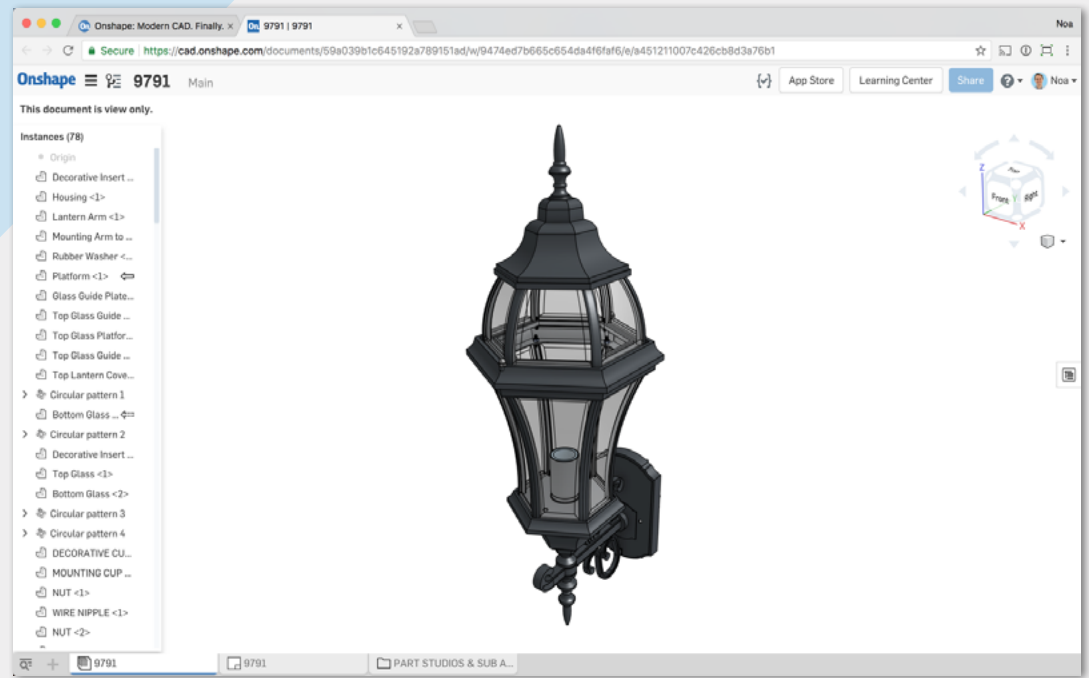### ◤ #1 Confusing Data Management: Which Version is the Latest Version?

"We're trying to design and build a quantum computer, which is an enormously complex device with thousands of individual parts," says Jonathan Mizrahi, a senior physicist at IonQ. "So it's of vital importance that this massive assembly have up-to-date parts, and we know what's final and what we're still editing."

"This is a big collaborative process. There are electronic components, optical components, vacuum chamber components, pieces we get from vendors and parts we're making ourselves. All of these things need to interface and work together," he adds. "We're all working on the same overall assembly, which of course has subassemblies, but we're all referencing back to that master assembly regularly."

IonQ began as an academic research project at the University of Maryland's Joint Quantum Institute Laboratory. Before the academics secured funding to launch a spinoff company, the team was using a PDM system to keep track of thousands of CAD files.

"The most frustrating thing about using PDM is that any given part has an owner – and until that owner checks the file back in and releases ownership, nobody else can edit that file," Mizrahi says. "The whole check-out/check-in process really slowed us down. And If people aren't careful and they still own a part when they go on vacation, things can come to a standstill. Of course, with Onshape there's none of that."

"I like that Onshape's version control is automated. No one has to be the owner. Everybody sees what everybody else is doing immediately," he says. "Every single change is recorded in Onshape so it's easy to have an instant 'undo' or to scroll back through anything you've done. Onshape gives us confidence that we always have the newest version and that everything is going to fit together as expected."

#1 Confusing Data Management: Which Version is the Latest Version?

KICHLER®

Based in Cleveland, Ohio, Kichler is a world leader in lighting design and distribution. The company delivers "an unparalleled variety of indoor lights, accessories and landscape lighting products in exciting style families, unique finishes, fresh colors and unequalled quality."

Kichler designs lighting products in Ohio and manufactures many of them in Asia. When the company was using its old file-based CAD system, it was sometimes reluctant to solicit multiple bids for manufacturing jobs – solely out of security concerns over their intellectual property.

Now Onshape's Sharing feature gives Kichler tight controls over who can access the one master copy of each design in the cloud. The company can grant view-only or editing permissions to outside vendors and instantly revoke those privileges when the bidding process is over. There are no copied files floating around the wild.

Beyond IP concerns, however, Kichler found the biggest obstacle to receiving competitive bids was the time needed to prepare quote packages for vendors.

"Under the old system, you'd have your CAD documents in a PDM vault and you'd have your spec sheet in another system," explains Mehul Gala, a Senior Product Development Engineer at Kichler. "Someone would have to collect that and convert it to a universal format. So if we had a SOLIDWORKS file, we had to convert it to a STEP file so that we could be sure that whoever we're sending it to can read it. And because we usually deal with large files, you have to package them somewhere on the network. Transmitting documents to multiple vendors is always a pain."

▶ #1 Confusing Data Management: Which Version is the Latest Version?

Since switching to Onshape, Kichler has organized its bid packages in a single Onshape Document, which works like a project-level container. Instead of having to search all over the place for CAD files and related data, Onshape users can model parts, sub-assemblies and top-level assemblies in one convenient place and also store PDFs, Excel spreadsheets, photos and video in separate tabs.

"Now when it's time to quote, we just invite the vendor into the Onshape Document," says Gala. "It's so much more efficient and convenient."

"I'd estimate that the preparation of a quote package using our old CAD system took probably in the neighborhood of eight hours or so," adds Doug Jones, Manager of New Product Introduction. "Now the preparation is basically nothing because all our important information is already there. So for every product we develop, I'd say we're now saving a day of technical preparation. That's pretty substantial."

▶ #1 Confusing Data Management: Which Version is the Latest Version?

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Lost Work:
CAD Crashes & File Corruption

THE PROBLEM:

Users of old file-based CAD systems are no strangers to software crashes. Some engineers report crashing several times a day (including [this rather angry one](#) who was hit with 19 crashes!), others are more fortunate to experience a few per week. Regardless of the frequency, it just takes one poorly timed crash to ruin your work day. Recreating lost work is not only aggravating, it's a step backwards for everyone on your team.

Why does old CAD software crash so often? It's because the mathematical computations going on in the background to create 3D geometry is far more demanding on the hardware than most other business-critical software. Furthermore, it's impossible for developers to test every possible combination of hardware, software and geometry out there, so compatibility problems are inevitable. Even just installing a new kind of software, such as an innocuous Windows update, can interfere with a file-based CAD system.

When you've been burned once, you live in constant fear of it happening again. As a defense mechanism, many engineers develop a nervous twitch – the "[CTRL+S](#)" twitch – to save their work every few minutes. But even this tactic has its pitfalls. When you save often, you may be unintentionally overwriting bad work over a previous design that in retrospect proved to be a better one. Want to go back? Sorry, your original idea is gone. You'll have to waste time recreating it.

Ironically, saving your data too frequently also increases the odds of corrupting your files. If your CAD system crashes while you are saving, the file structure will be incomplete (and therefore, corrupt). And if you have to recreate corrupt files, you may also have to fix other parts, assemblies and drawings that reference those corrupt files. It's a pain that keeps on throbbing.

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Lost Work:
CAD Crashes & File Corruption

THE SOLUTION:

Because it is based on a cloud and database architecture instead of files, Onshape has made CAD crashes, lost data and corrupt files a thing of the past. Taking CAD off your hard drive eliminates disastrous software combinations. Redundant servers ensure that you'll never lose your work again.

In Onshape, there is [no Save button](). Every design change is recorded [forever](). So you can always instantly go back to any previous version of your design. You never have to remember to save or check in a file.

Moreover, modern CAD users never experience the negative impact of crashes. Although no software is 100% crash proof, on the rare instances when Onshape does crash, your data is already saved on redundant servers and a new instance of the failed software component takes over in just a few milliseconds. You likely will not notice anything happened. The worst scenario that you will see is a message to refresh your browser.

Onshape users experience no major disruptions, no data loss, no time loss and no hair loss!

How Companies Are Reducing
CAD Crashes & Preventing Lost Work
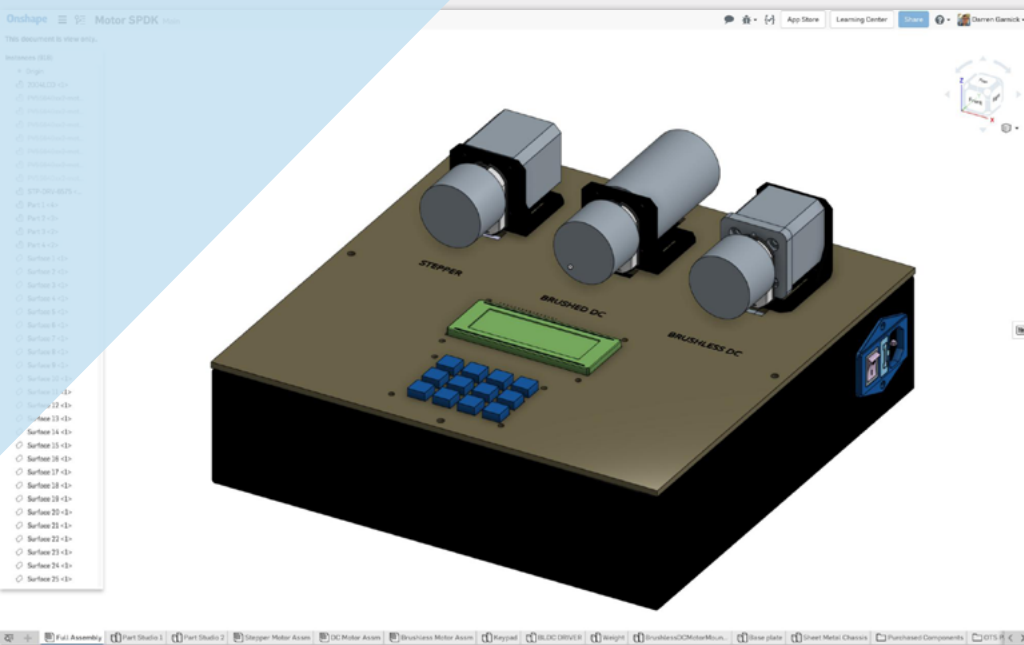
Based in Seattle, Washington, Synapse is a global product development and consultancy firm that solves complex engineering challenges for brands, and designs products that accelerate advances in technology.

After losing her CAD files one too many times, Synapse mechanical engineer Katherine Stegner confesses she's developed an automatic reflex to frequently click the save button.

"I've definitely had the experience where SOLIDWORKS crashes, and I've lost data. Sometimes SOLIDWORKS Auto-recovery works, and you get your files back, but definitely not always," she says. "So now I have a compulsive "Control-S" Save mentality where my fingers just automatically do that all the time without even thinking about it."

"I've actually done that in Onshape and feel weird when I can't save it," she adds. "Because in Onshape, it's always saved."

Aside from putting extra stress on your keyboard, Bret Richmond, Director of Mechanical Engineering at Synapse, notes that CAD crashes tend to happen at the most inconvenient times.

"We've had cases with older CAD systems where people have lost a significant amount of data over the course of a half day," he recalls. "There's no recourse but to go back and redo the work. That may not sound like a big deal, but if the client is expecting to be at a certain milestone at the end of that day or even at the end of that week, that means that engineer has to double down and do that work in either half the time or spend more time at work."

◣ #2 Lost Work: CAD Crashes & File Corruption

Onshape users never lose work due to CAD crashes because their data is saved on redundant servers. If there is a server failure, a computer crash or a power failure, engineers need only to log on to another computer, tablet or phone to continue working where they left off.

"My hope for any tool is that it reduces friction for us to put more of our mind share into the creative aspect of design and engineering," adds Richmond. "Our thinking about how to make the tool work should be as minimal as possible. Onshape achieves that. It gets out of the way so we can focus on our designs."


Based in Raleigh, North Carolina, _Voxel Innovations_ is an innovator in Pulsed Electrochemical Machining (PECM), an advanced manufacturing process unrivaled in its ability to quickly and accurately machine specialty metal alloys found in turbines, medical devices and surgical equipment. The company's mission is to use PECM and related manufacturing technologies to supply critical, high-value parts to aerospace, energy and healthcare customers.
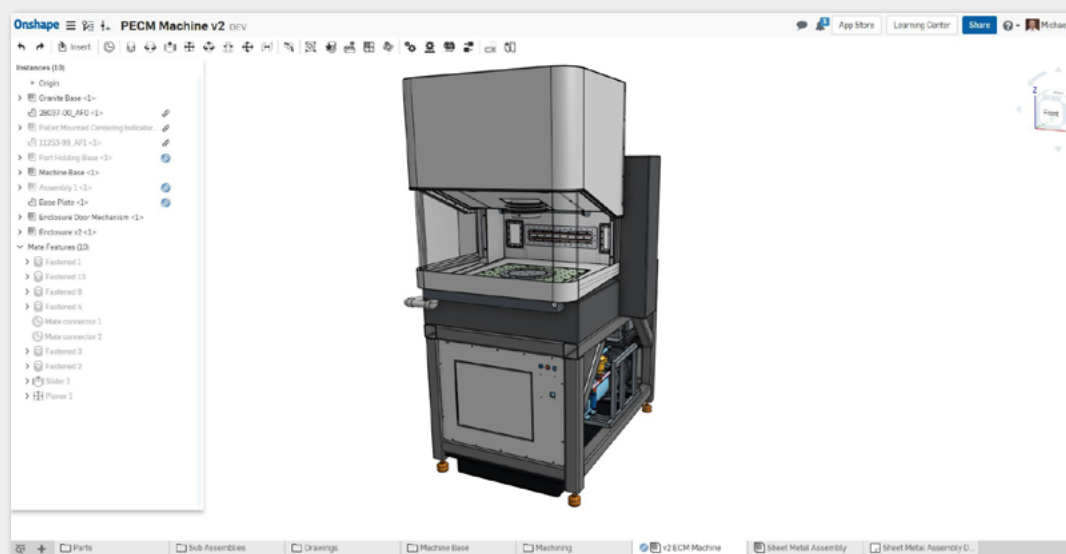
"I haven't used a file-based CAD system yet that hasn't crashed on me," laments Michael Bromley, the lead mechanical engineer for Voxel Innovations.

"It especially happens in the concept-generation stage," he says. "I'd have a lot of interworking components making up a small subassembly and I'd get very involved in changing things around and generating a bunch of new designs before I was ready to release anything. Then, I'd forget to save – because my design was in progress and far from done – and it would crash and I'd have to start over."

"I've never lost work in Onshape," Bromley adds. "And I never have to remember to hit the save button. At this point, it would be a struggle to return to our old CAD system."
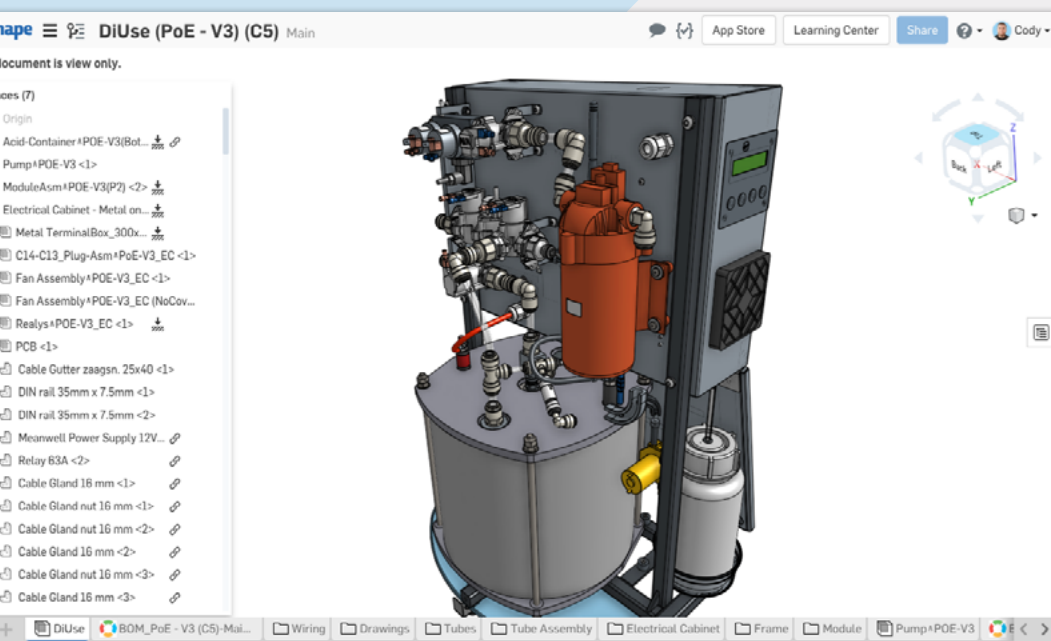
Founded in 2009, Voltea is a Netherlands-based water technology company with offices in Amsterdam and Dallas, Texas. The company designs and manufacturers energy-efficient water treatment systems that are salt-free and chemical-free, making it environmentally safe for agriculture when water is recycled.

▶ #2 Lost Work: CAD Crashes & File Corruption

Voltea is the inventor of Membrane Capacitive Deionization (CapDI©) technology, which not only removes negative ions (salt/hardness) from water using electricity, but also enables users to "tune" that water to their desired salinity regardless of any fluctuations in feed water characteristics.

Previously focusing on industrial applications, Voltea has now miniaturized its CapDI technology for homes and small businesses. "CapDI is a very scalable technology so we can shrink it down to a very small size for just making a glass of drinking water," explains Voltea lead engineer Steven Whitacre. "Or we can scale it up to a very large industrial system that can feed a commercial laundry, a data center or a coolant tower."

When Whitacre was scaling up his design team from 2 to 5 engineers, he switched from SOLIDWORKS to Onshape, initially seeking a better data management solution without having to add on a complex PDM system. However, he was also fed up with dealing with CAD crashes.

"We work with big assemblies and SOLIDWORKS would often crash. There was always some random little thing that would cause a crash, like if you changed to a certain display state or you opened the wrong configuration and the wrong files opened," Whitacre recalls. "I haven't experienced crashes at all with Onshape. That alone probably saves us a half an hour a day."

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Restricted Access to Your CAD System

THE PROBLEM:

It's not uncommon for project managers to wait forever to give new engineers access to CAD. They first need to buy a new license code from their Value Added Reseller (VAR), a process that can take days or weeks depending on the VAR's responsiveness. Then the IT department needs to provision a computer and devote several hours for installation per CAD seat. When engineers are ready to CAD, the CAD usually isn't ready for them.

Also, with old CAD systems, access is tied to the license, not the user. So engineers are tied to their office computers and cannot work anywhere else. Furthermore, Mac enthusiasts have not been able to use some CAD systems without first installing virtualization software to run Windows. This extra layer of software can lead to additional issues (see Design Gridlock Symptom #2: CAD Crashes & File Corruption).

THE SOLUTION:

Onshape offers real-time CAD deployment. Whenever a new member is added to a design team, he or she can start working in minutes, on all of their computers, phones and tablets. Onshape runs in an internet browser and with mobile apps (Android and iOS) so engineers can always carry their entire CAD system and their CAD data with them. Onshape also works with Macs, PCs, Linux or Chromebooks, so you can focus more on your designs versus worrying about your machine.

#3 Restricted Access to Your CAD System

## How Companies Are Taking Advantage of Instant CAD Access Anytime & Anywhere
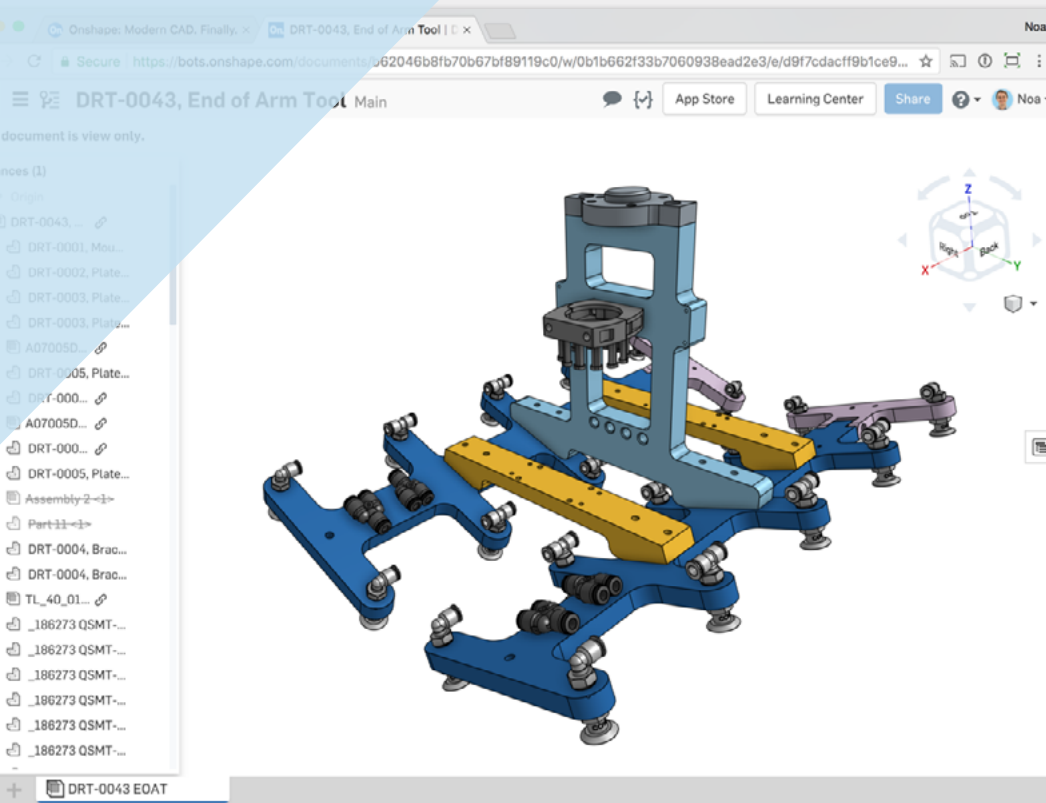
Based in Nashville, Tennessee, Hirebotics builds cloud-connected "robots for hire," making automation easy, affordable and within the grasp of manufacturers across all industries and of every size and type.

"One of the really nice things about Onshape is the ability to access and work on a CAD model in the field," says Matthew Bush, Chief Operating Officer and co-founder of Hirebotics. "If we're sitting in the factory trying to figure out how a robot goes together, we can pull up the model on our phone and solve the problem right there."

"Being able to use Onshape in the field is very unique and very new and it's really helped us leverage our time and make us faster," he adds. "We don't have to put big drawings books together and take them with us anymore. We can make changes on the fly to whatever we need without having to go back to a CAD station."

"Most of our customers are just floored when we pull up the model on our phone," Bush says. "Even if it's just for a proof-of-concept review. They're astounded. The experience has actually convinced a couple of our customers to become Onshape customers."
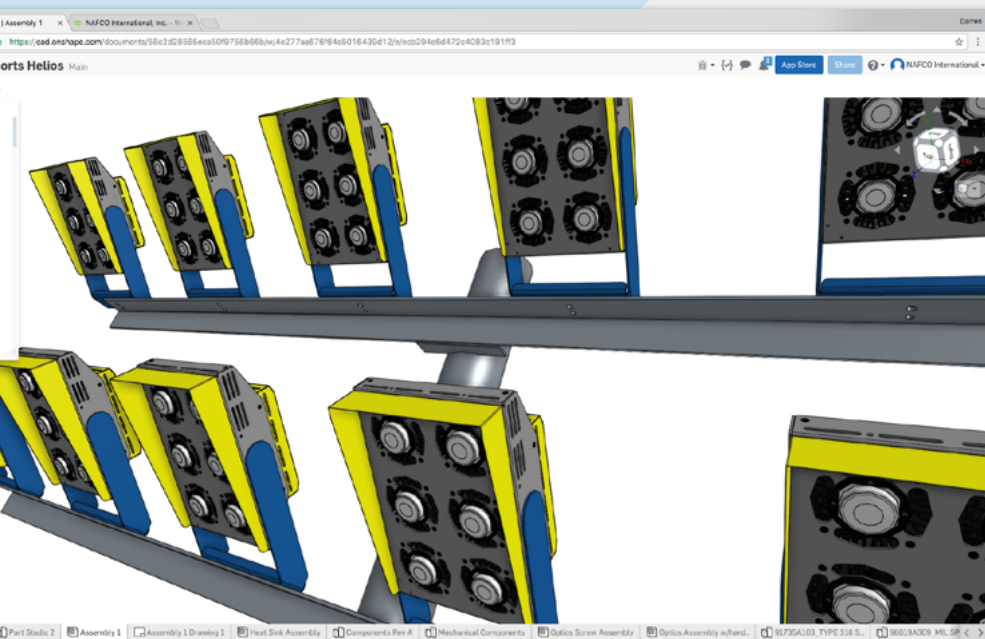
NAFCO

Based in Fond du Lac, Wisconsin, [NAFCO International](#) designs, manufactures and distributes specification-grade light poles, brackets and high-output LED lighting products for a variety of commercial, industrial and municipal applications. NAFCO clients include Alcoa, Amazon, Disney, Toyota, the U.S. Army and the U.S. Air Force.

▶ #3 Restricted Access to Your CAD System

According to NAFCO engineer Trent Burmesch, the product shelf life in the outdoor lighting industry is 2 to 3 years and there is an ongoing pressure to quickly make design improvements and create new offerings.

One of their more popular products is [Helios Olympia](#) outdoor stadium lights, which work in cold temperatures as extreme as minus 40-degrees Celsius or minus 40-degrees Fahrenheit (that's the only spot on the thermometer where Celsius and Fahrenheit meet).

To speed up their design of the Helios, NAFCO relied on Onshape, a modern professional CAD system that runs on any computer, phone or tablet. "There's now a more rapid pace to design and development – and from idea to creation, we need to do things very, very quickly," says Burmesch. "We're not in the business of scheduling meetings to discuss problems. If we have an idea, in many cases, we'll pull up the design model, and we'll hash it out. I think that Onshape is a tremendous help with that."

"While I'm meeting with our metal fabrication guys, I can just pull up Onshape on my iPad and say, 'Hey, what do you think about this? How can we improve it? How can we reduce costs?'" he adds. "I also like the flexibility of accessing CAD wherever I'd like. It doesn't matter if I'm working at home or at the office. I've even designed things in the car (as a passenger). You just can't do that with other CAD systems."

4

Software Incompatibility and Forced Installed CAD Upgrades

THE PROBLEM:

Even if you and your external partners (designers, manufacturers, suppliers) are using the same old CAD vendor, if you're using version 2018 and they are using version 2017, you still cannot read each other's files. Even brand loyalty doesn't immunize you from software compatibility problems. You will both be running in place until your partner pays for their forced upgrade and then installs it. Or you might be the one who needs to upgrade.

Once you do upgrade, however, the installation might cause more problems than it solves. Old file-based CAD is not backward compatible, even with itself. So your company needs to upgrade every installation it owns. Then you need to run through all your existing CAD files and update them to the new software version. Things can and do usually go wrong during this upgrade process, especially since that year's worth of new code has not been used in production yet – so the odds of a negative interaction increase.

Even not including the required updates to a PDM system (if you have one), that's a lot of IT overhead – and a lot of waiting for everyone on your team to get back to work.

THE SOLUTION:

Onshape automatically delivers new features and functionality in the cloud every three weeks at no extra cost. Nothing to download. Nothing to install. Every Onshape user in the world is always on the same software version – the latest one.

How Companies Are Eliminating
# Software Administration & I.T. Hassles
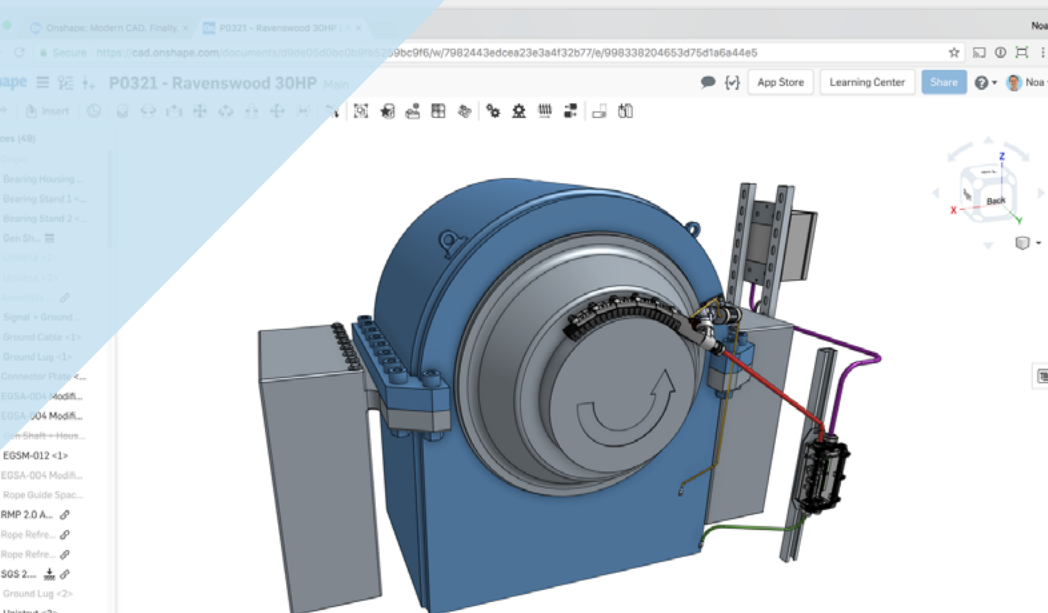
CUTSFORTH
THE POWER OF INNOVATION®

Based in Ferndale, Washington, Cutsforth designs and manufactures best-in-class excitation brush holders and shaft grounding systems for some of the world's largest power companies.

"We were SOLIDWORKS users and we loved SOLIDWORKS – It's a great tool but you have to keep doing upgrades," says Cutsforth CEO Rob Cutsforth, who is also the primary product designer. "You have to upgrade every computer and upgrade your software and we're a small company. We just don't have the resources to maintain that when something breaks, something doesn't work."

"When you use CAD in the cloud, it's amazing how many frustrations and headaches just go away," he adds. "You just use the tool for what it's supposed to do. We have never seen ourselves as IT people. We're product development people."

"Onshape takes on those IT responsibilities for us," Cutsforth says. "And that helps everybody be as fast as they can be. I like it Onshape's updates just come on a regular basis (every three weeks). They're incremental improvements and you can easily absorb them. You learn about the new improvements and just keep going. It's just much more efficient."
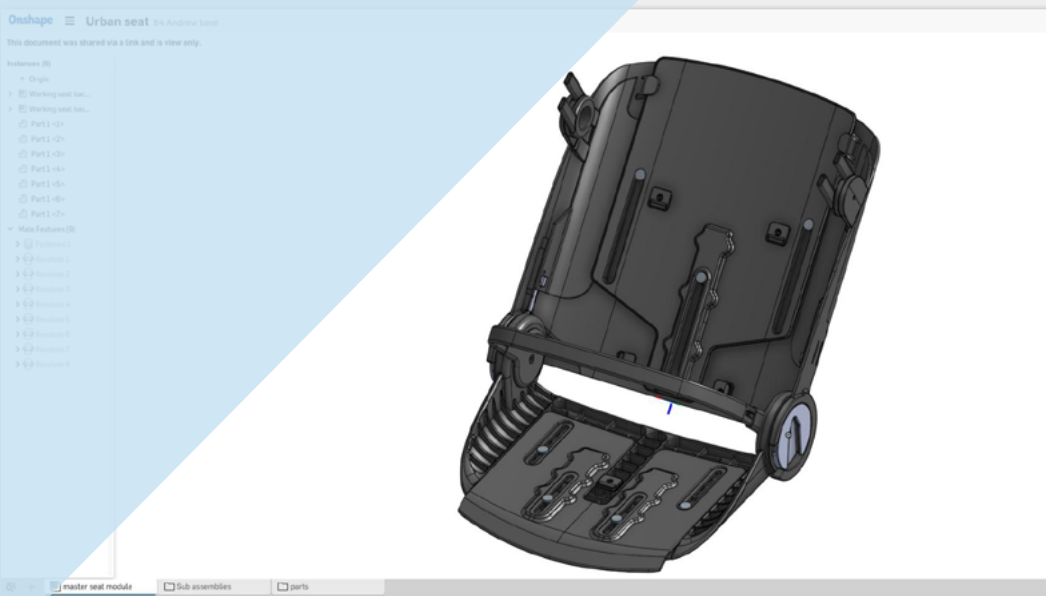
phil&teds®

Based in Wellington, New Zealand, [phil & teds](#) is one of the world's leading inventors, designers and marketers of juvenile products, including strollers, bassinets, high chairs, baby carriers, and car seats.

▼ #4 Software Incopatibility and Forced Installed CAD Upgrades

For six years, Phil Brace, the lead designer for phil & teds, was resistant to upgrade from SOLIDWORKS 2011 because the CAD package did everything he needed. The price tag was also a major deterrent.

"if we wanted to upgrade, it would cost us $40,000 and the software hasn't really changed much. There's a few more tricks and a few more tools, but I don't see the value in the upgrade costs. I just don't see the upside," Brace says. "Essentially, it's a bit like Photoshop. There's really no creative difference between an old version of Photoshop and a new one. It still does the same job."

"I've always got my eye out there on what's new and I was repeatedly hammered by SOLIDWORKS to upgrade from 2011. And every time they made the proposal, I thought, 'Oh, I just can't bring myself to do it,'" he recalls. "We hosted the 2017 SOLIDWORKS product release here in our office for the local Wellington area and as I sat through the presentation, I couldn't see the value for us."

That's when I seriously looked around and found Onshape, and I haven't looked back since," Brace says.

phil&teds®

5 Blocked Communication and Collaboration

THE PROBLEM:

When using old file-based CAD systems, engineers usually need to choose one of these four options to share their work: 1. Email files; 2. Put them in elaborate Product Data Management (PDM) systems which require CAD users to check out files from "the vault"; 3. Put them on an FTP site; 4. Use a storage service like Dropbox or Google Drive. All of these options involve partners sending files back and forth and waiting for feedback.

Also, unless two engineers are physically sitting next to each other, it is difficult to simultaneously collaborate on the same 3D model. Kludgy solutions exist that involve sharing a computer screen on GoToMeeting and getting on the phone. However, multiple engineers cannot be creating or editing the same model at the same time. They have to work serially, one person at a time.

THE SOLUTION:

Onshape Sharing allows companies to securely and instantly collaborate with a colleague, vendor, customer or partner by granting them editing, commenting or view-only access rights to a CAD model. Equally valuable is the ability to instantly withdraw outside access to your designs when a project is over, reducing the risk of unintentionally leaking your intellectual property.

Onshape's built-in collaboration tools allow multiple people to simultaneously work on the same part or assembly. When anyone, anywhere makes a design change, everyone else on the team instantly sees it.

◤ #5 Blocked
Communication
and Collaboration

How Companies Are Dramatically Improving Communication & Collaboration

Based in Dunlap, Tennessee, Carbon Black Global designs and builds eco-friendly trash-to-energy systems that convert waste materials into activated carbon and syngas, which can generate steam or electricity. Customers include food processors, textile factories, farms, hotels, shopping centers, petrochemical plants, municipalities and the U.S. military.
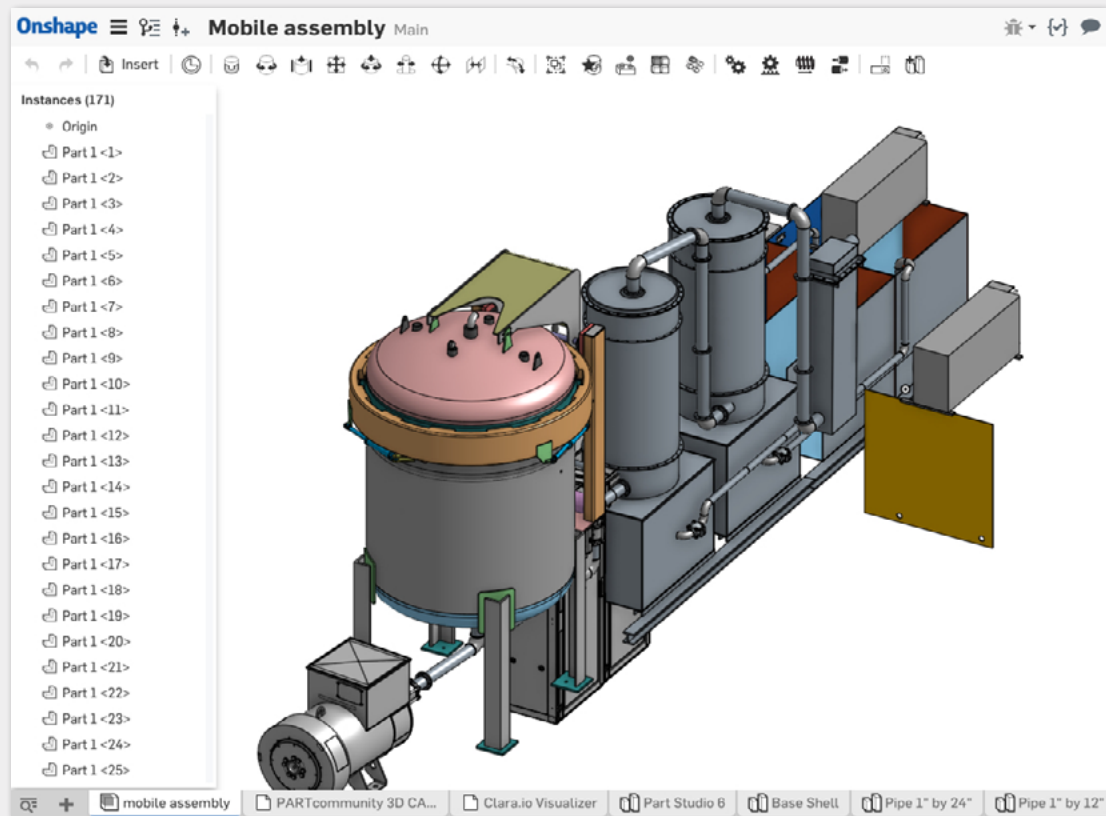
When Carbon Black Global was first developing its mobile trash-to-energy plants – which can process unsorted landfill garbage (including plastics, tires and diapers) into clean steam or electricity – its design team was like a CAD Tower of Babel.

With its team spread between multiple locations – Tennessee (Maffett-Loftis Engineering LLC), Georgia (Practical Steam), Washington (Designworks Ltd) and Ontario, Canada – the company had to deal with the chaos of engineers working with three different CAD systems.

"I was using AutoCAD, one of my engineering consultants was working in SOLIDWORKS and another engineering firm was using Pro/ENGINEER," recalls Earl Decker, Vice President and patent holder of Carbon Black Global. "We struggled for a while using all these different systems, and to be honest, it was a real pain in the neck."

▼ #5 Blocked Communication and Collaboration

To get the entire design team on the same page, CBG switched to Onshape, a modern professional CAD system that unites 3D modeling tools and design data management in a secure cloud workspace. The value of having multiple team members working together on the same model in real time is immense, says Decker.

"If we change one part, the entire team can see it right way. There's no confusion over what version of the design we're working on," he says. "That was one of the keys for us to adopt Onshape. If a colleague wants to make a change, I say, 'yeah, go ahead!' and we both see it happen."

"That's all I think about is continuous improvement. How can I make this better? What if I do this? Using Onshape's comprehensive edit history, all the changes are automatically tracked for me. I can go back to any of my old parts, make a change, flip it into a diagram, share the PDF and it's done. It's just incredibly fast," Decker adds.

When CBG engineers were each using their old CAD systems, projects were constantly interrupted by the need to make all the incoming design data compatible.

"Since switching over to Onshape, I'd say we're easily saving hours a day," says Decker. "I was working with three different drawings and it would take me a day to import them and get them in the right places. Onshape's very intuitive so there was a very quick learning curve."

Petrak Industries, Inc.
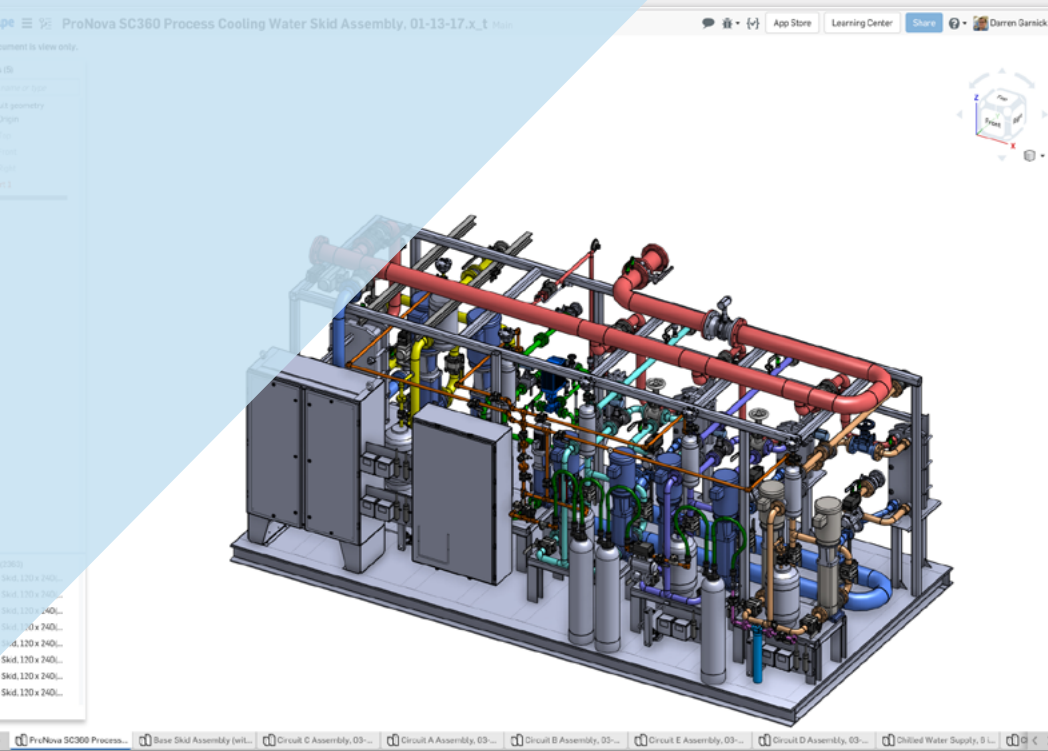
Based in Joliet, Illinois, [Petrak Industries](#) designs and builds modular and skid-mounted process systems for fossil fuel power plants, oil refineries, wastewater treatment plants and other industrial applications.

▼ #5 Blocked Communication and Collaboration

Petrak industries engineer Brian Joffe says he relies heavily on Onshape's instant sharing feature to give his design clients and partner companies immediate access to his 3D models with a mouseclick.

[Onshape Sharing](#) allows you to securely and instantly collaborate with a colleague, vendor, customer or partner by granting them editing, commenting or view-only access rights to a CAD model. Equally valuable is the ability to instantly withdraw outside access to your designs when a project is over, reducing the risk of [unintentionally leaking your intellectual property](#).

When using SOLIDWORKS or any other file-based CAD system, engineers usually need to choose one of these four options to share their work:

- ▼ Email files

- ▼ Put them in elaborate [Product Data Management](#) (PDM) systems, which require CAD users to check out files from "the vault"

- ▼ Put them on an FTP site

- ▼ Use a storage service like Dropbox or Google Drive

▼ #5 Blocked
Communication
and Collaboration

According to Joffe, Onshape's sharing feature recently saved him five weeks in the design of complex refinery equipment for the R&D department of a major oil company.

"We were very tight on timeframe," he says. "We couldn't afford the time it usually takes to make formal drawings of a large, complicated piece of equipment. And so they wanted regular updates on my progress. How did you do this week? Can we view partial progress so we can determine if you're going down the right path?"

"Everyone looking at the model had very specific needs. The project manager's interested in how far did I get? The mechanical engineer's checking if we got all his details right. And the safety engineer's asking, "Okay, when somebody's standing in this location on the skid, how can they get out of there in an emergency?" So for them to review my progress without me having to make formal, final drawings got us to the point where we could start fabricating much sooner," Joffe says.

"My customers are blown away by Onshape," he adds. "They're thrilled they can follow my progress in a browser and not have to go through any of their IT guys first."

Capsonic Automotive & Aerospace
A Capsonic Company
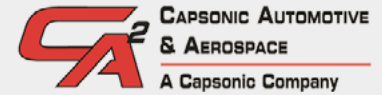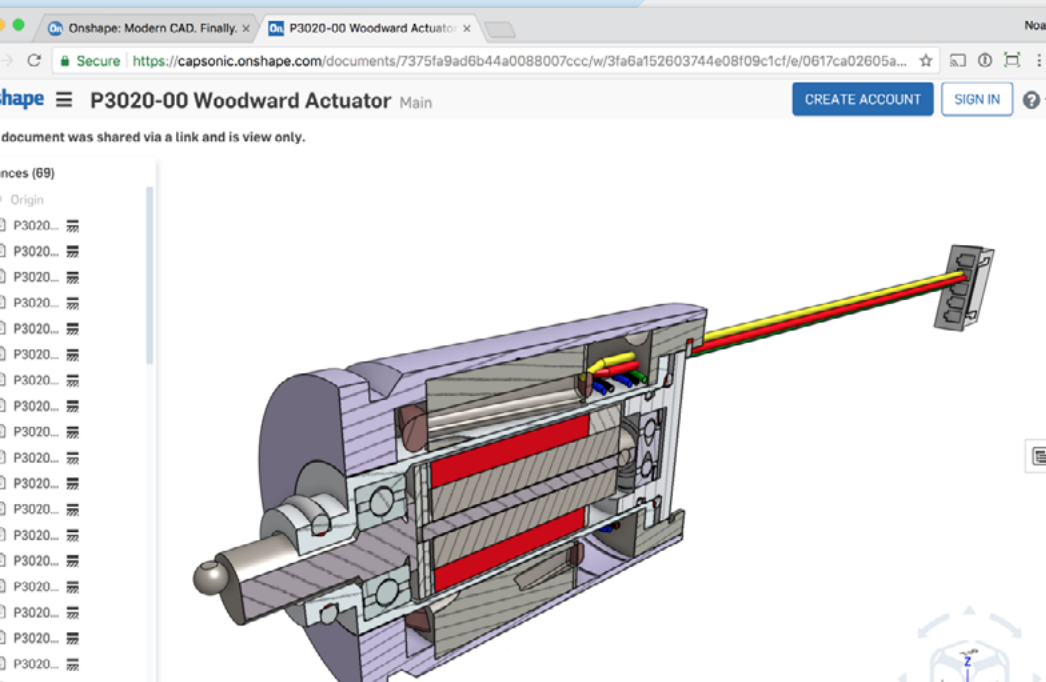
Capsonic Automotive & Aerospace is a manufacturer of high-quality, end-item electromechanical assemblies serving the automotive, aerospace, heavy truck and military vehicle markets.

▼ #5 Blocked Communication and Collaboration

"Half my product development team is based in Juarez, Mexico, and the other half works in Elgin, Illinois – and I split my time between both facilities," says Dennis Breen, VP of Engineering & Technology at Capsonic Automotive & Aerospace.

"Using the real-time analytics in Onshape Enterprise helps me keep track of who is working on what and when, so I can better prioritize how our engineers spend their time," he says. "I also like the option to add light users so our manufacturing engineers and automation engineers can immediately access the latest 3D CAD data and use it to improve our processes."

"In our previous environment, I had to separately manage the flow of SOLIDWORKS data between facilities. And they all had to have SOLIDWORKS installed on their computers," Breen adds. "None of that comes into play anymore. With Onshape, they can just log in and have access to all the data whenever they want to look at it. It helps us be much more efficient with our workflows."

6 Inadequate Customer Support

THE PROBLEM:

Historically, the CAD industry has a horrific reputation for ignoring customers when they file bug reports or enhancement requests. Radio silence is the norm. As for talking directly with your CAD vendor? Good luck. In many cases, you need to go through a middleman, your Value Added Reseller (VAR).

THE SOLUTION:

Onshape has a built-in Feedback tool that puts you in direct contact with Onshape Support. When you send in a request, you get emailed an immediate acknowledgement of receipt and can track the status of your ticket anytime. Many Onshape customers report having their issues resolved within days or even hours.

Furthermore, the same CAD collaboration tools that help Onshape users better communicate with their external partners can also be used by engineers communicating with Onshape Support. Customers who choose to share their models with tech support usually achieve even faster results.

▼ #6 Inadequate
Customer Support

How Companies Are Benefiting From Responsive Tech Support

Based in Newton, Massachusetts, Heuresis makes handheld X-Ray imaging devices that allow law enforcement to more easily find illegal drugs, weapons and contraband in hidden compartments inside buildings, furniture, appliances, vehicles, luggage and other objects. The equipment allows police to detect and search hidden compartments without having to destroy property.
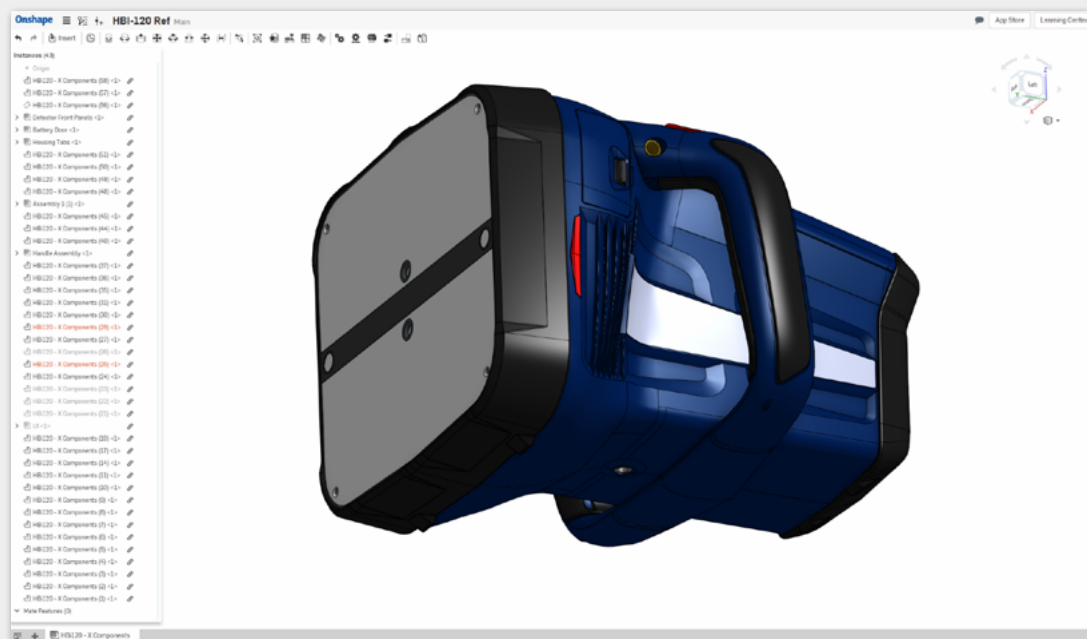
"Onshape's customer support team has been really responsive," says Heuresis mechanical engineer Howard Kellogg. "Our requests have gone into two buckets. There have been bugs or questions like, 'Wait, is this supposed to work this way?' And they've been very quick to either say, 'Yeah, we're working on this,' or 'No, you're just doing it wrong. This is actually the way it's supposed to work.' They've been really helpful."

"I also like that we've been invited to participate in some of Onshape's early visibility testing. Our engineers are able to give them input into new functionalities being developed," he adds.

"When we were dealing with SOLIDWORKS, there was no way for the customers to talk directly to the company. You had to go through your VAR. I could give input, but everything was filtered through them. So I felt there wasn't an easy way to let the company know about things I wanted to see. And even if I could, it's such as giant ecosystem that I felt my voice was going to be drowned out," Kellogg says.

"Onshape Support usually gets back to me within the same day or the next day," he says. "It's such a huge difference."

▼ #6 Inadequate
Customer Support

Based in Cambridge, Massachusetts, Silverside Detectors develops more affordable nuclear radiation detection technology to protect cities from the threat of nuclear terrorism. Silverside makes neutron detectors that can fit in a backpack, an electrical utility box, the back of an SUV, or small trailer. They can be permanently installed or quickly moved to an area/event that's a high-risk target (i.e. Olympics, Super Bowl or Presidential visit).
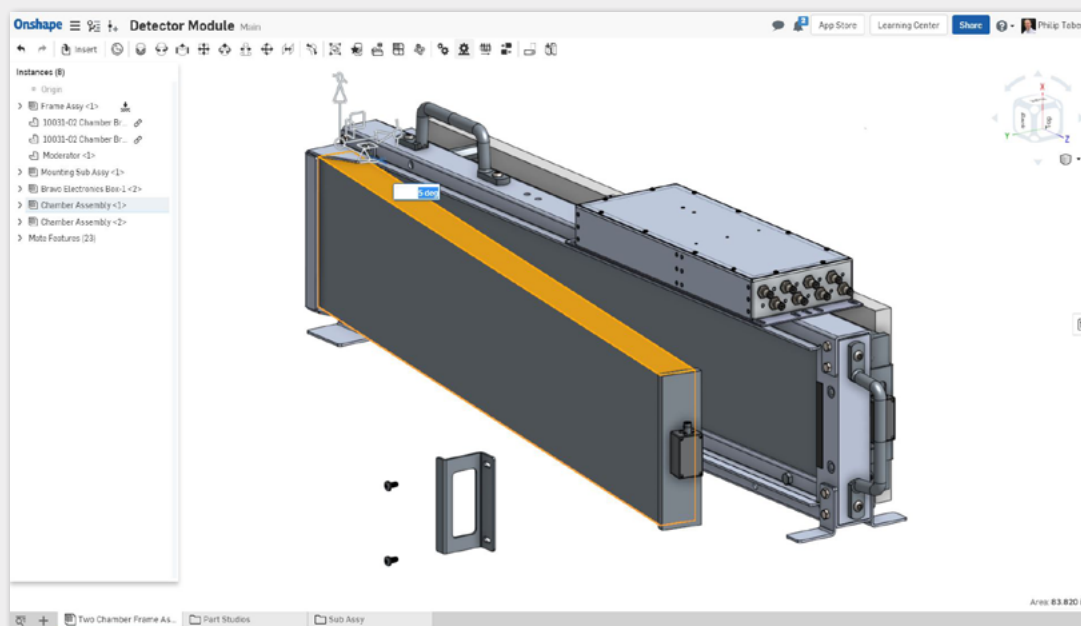
"Whenever I contact Onshape Support, I rarely wait even two hours for a response," says Silverside engineer Philip Taber. "And everyone is really knowledgeable about the product. I recently asked if they could create a feature that would let me offset an extrusion from a center plane and then have it extrude back to a face[n]. Lou got back to me right away and said, 'actually, you can already do that.'"

"Not everything gets resolved immediately, but you can always track the status of your requests," he adds. "When I was at my previous company and using another CAD system, we didn't have contact with our reseller. Onshape is so much more responsive."

"I wouldn't want to go back to my old CAD system, not by a longshot," says Taber. "Onshape is like driving on this beautifully new road that's all nice and smooth. Occasionally, you have to avoid a pothole for something (a feature) that doesn't exist yet, a little rough patch. But it's so much better."

Onshape

Onshape

MODELING TOOLS

DATA MANAGEMENT
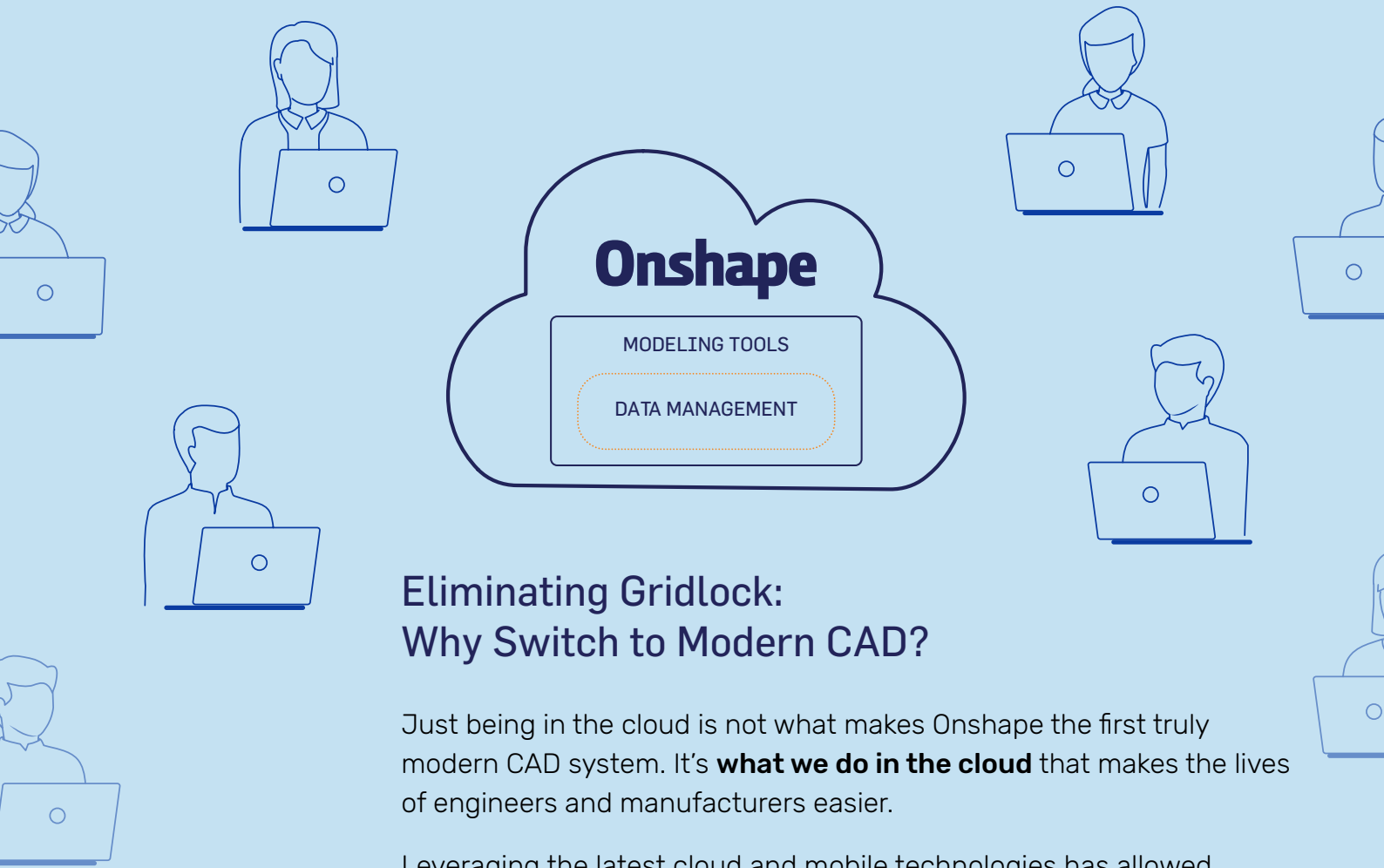
Eliminating Gridlock: Why Switch to Modern CAD?

Just being in the cloud is not what makes Onshape the first truly modern CAD system. It's **what we do in the cloud** that makes the lives of engineers and manufacturers easier.

Leveraging the latest cloud and mobile technologies has allowed Onshape to create new Advanced Modeling tools and new Design Data Management tools that were never possible under the constraints of old file-based CAD.

The modern equation looks like this:

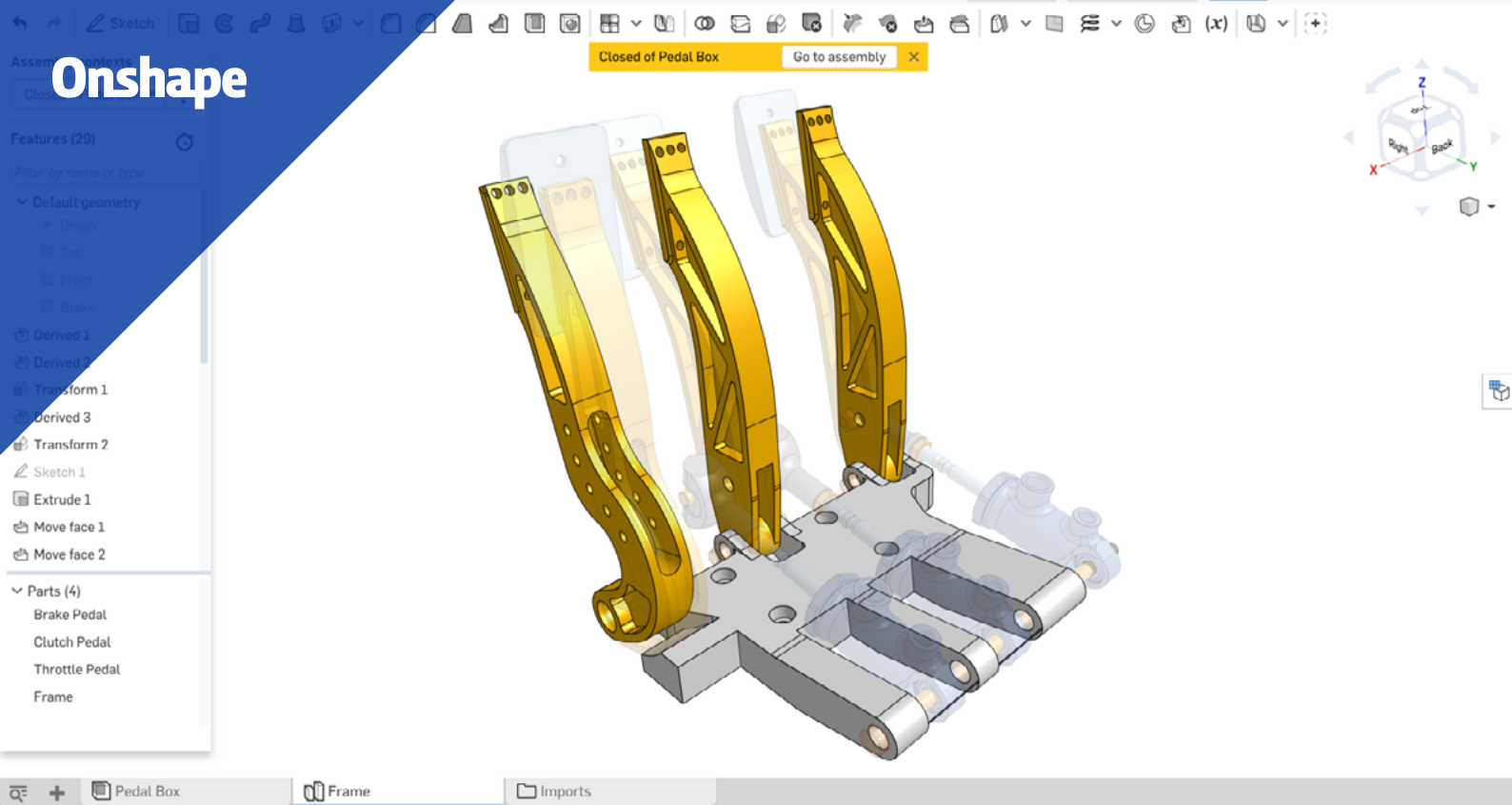$$\text{Modern CAD} = \frac{\text{Advanced Modeling Tools} +}{\text{Built-In Data Management} +}$$
$$\text{a Secure Cloud Workspace}$$

Reviewing the superior CAD security measures that this formula delivers is worthy of its own eBook.

But let's take a quick look at the other two CAD breakthroughs.

Peace-of-Mind
Using Onshape's Managed In-Context Design ensures that your CAD models will always update the way you expect them to – even if there is motion (a big troublespot for other systems).

What Are Onshape's Advanced Modeling Tools?

Parametric feature-based CAD was first introduced back in 1988 – and the fundamental ways that engineers model really haven't changed much since. Using an ordered list of parametric features to make a part worked very well back then and many things still work well today. But many things don't.

Onshape's new "Parametric Modeling 2.0" approach improves the best parts of old parametrics and eliminates the weaknesses. Parametrics 2.0 ushers in systematically better ways of modeling in such areas as:
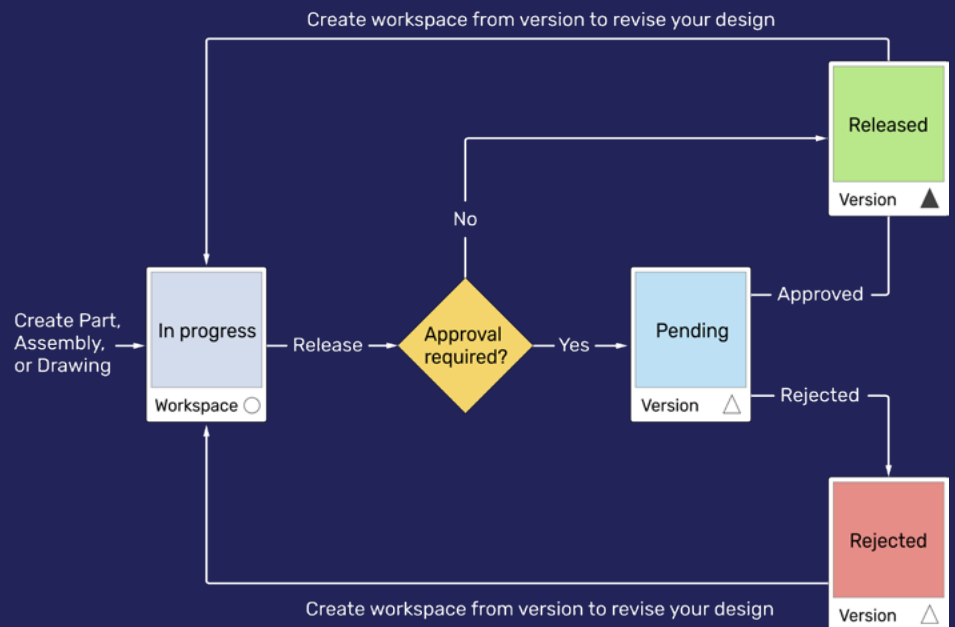
1. **Multi-Part Design** – In Onshape's Multi-part Part Studios, all parts related to one another are designed together in one place – where it most makes sense – instead of modeling them in separate files. Multi-part design is now a much smoother experience.

2. **Configurations** – When creating part configurations, old CAD systems require you to build monstrous tables – sometimes with hundreds or thousands of rows – for each conceivable permutation. Onshape has dramatically reduced the number of required table rows and cells, making sophisticated and complex configurations more manageable. For example a 375-cell configuration table in old CAD can be expressed in Onshape with just 3 tables of only 5 cells each.

Onshape

3. **Standard Content** – In Onshape, fasteners (screws, bolts, washers, nuts, etc.) have built-in mate connectors, making standard content smarter and making positioning in assemblies much easier. Onshape has added the "fit" to "form, fit and function."

4. **Managed In-Context Design** – Old file-based CAD systems offer users the ability to add in-context relationships between parts in the context of an assembly so modifying one part will affect another. Unfortunately, changing these in-context parts often erroneously changes other parts in unpredictable ways. Onshape's Managed In-Context Design tools have ended this madness. Your CAD models now always update the way you expect them to – even if there is motion (a big troublespot for other systems).

5. **Simultaneous Sheet Metal Tools** – Seeing flat, folded and tabular sheet metal views side-by-side allows you to visualize errors and interferences immediately. When you edit one view, the other two are synchronized automatically. These simultaneous tools ultimately reduce scrap and wasted time.

6. **Custom Features** – Ever wish you could change the way your CAD system's features work? Onshape's open programming language, FeatureScript, lets you create custom industry-specific CAD features that eliminate repetitive tasks.

Onshape didn't invent parametric modeling, but it has fundamentally improved it at the core.

Create workspace from version to revise your design

In progress — Release → Approval required? — No → Released / Version ▲

Approval required? — Yes → Pending / Version △ — Approved → Released

Pending — Rejected → Rejected / Version △

Create Part, Assembly, or Drawing → In progress / Workspace ○

Create workspace from version to revise your design

How Has Onshape Improved Design Data Management?

As explored earlier in this book, Old CAD's approach to data management relied on the error-prone process of locating, validating, organizing, and archiving hundreds (if not thousands) of individual design files. This archaic process often led to version control problems – confusion over which version of a design file was really the latest version.

And for those companies using expensive and outdated Product Data Management (PDM) systems, there has been a different set of gridlock problems: Frustrated colleagues waiting for each other to check in and check out files before they can continue their own work.

So what's different about Onshape's "Design Data Management 2.0" approach? Here are the key reasons why modern CAD users can stop worrying about organizing their data and focus more on creating innovative designs:

▸ **Database Architecture, Not Files** – Onshape stores designs in a cloud-hosted database that presents data to users as virtual documents showing all design history. We log all actions by all users at the feature level and allow you to go back to any previous state of your model – forever. It is always clear what is the latest version, who has access to it, and who did what. Onshape users also never lose work due to CAD crashes.

Onshape

▼ **Secure Cloud Workspace, Not Scattered Copies** – Onshape stores design data in a secure cloud workspace accessible from anywhere by authorized users. Administrators can prevent users from making local copies or exporting sensitive data. When a user no longer needs access, administrators can revoke it and ensure there are no extra copies floating around.

▼ **Parallel, Not Serial** – Onshape's unique database architecture allows engineers to explore multiple design directions in separate branches and then later merge desirable changes back into the main branch. This allows engineers the freedom to explore alternative designs in parallel, resulting in faster, better innovation.

▼ **Instant Collaboration, Not Meetings** – Onshape provides robust tools for sharing designs with other engineers or stakeholders, offering and receiving comments on designs, and comparing and accepting changes – all in a single cloud workspace without having to make copies. This allows teams and extended groups of stakeholders to stay in sync, instantly see what each other is doing, and keep work flowing without the friction, confusion, and time-sucking meetings that plague the old CAD collaboration process.

▼ **Design and Data In One Place, Not Many** – Onshape puts the data management experience right in the design experience instead of forcing the user to switch between their modeling tool and their PDM system. This theme of deep integration and putting the right interface in front of the right user at the right time is something our UX team has championed since day one, and our production customers absolutely love it.

▼ **Zero IT** – Onshape set out to deliver a system that would never require dedicated IT, installation of servers, or installation and upgrading of desktop software. For engineers who have been forced to master these tasks, there is a collective deep sigh of relief!

Extending the foundational principles outlined above, Onshape's Release Management & Approval Workflow now **lets you create a proposed release in minutes instead of hours**, including any combination of parts, assemblies, configurations and other assets. This eliminates the need to buy an expensive PDM system. And once a release is defined, Onshape's built-in approval workflow allows designated supervisors to approve or reject designs without interfering with their team's other current activities.
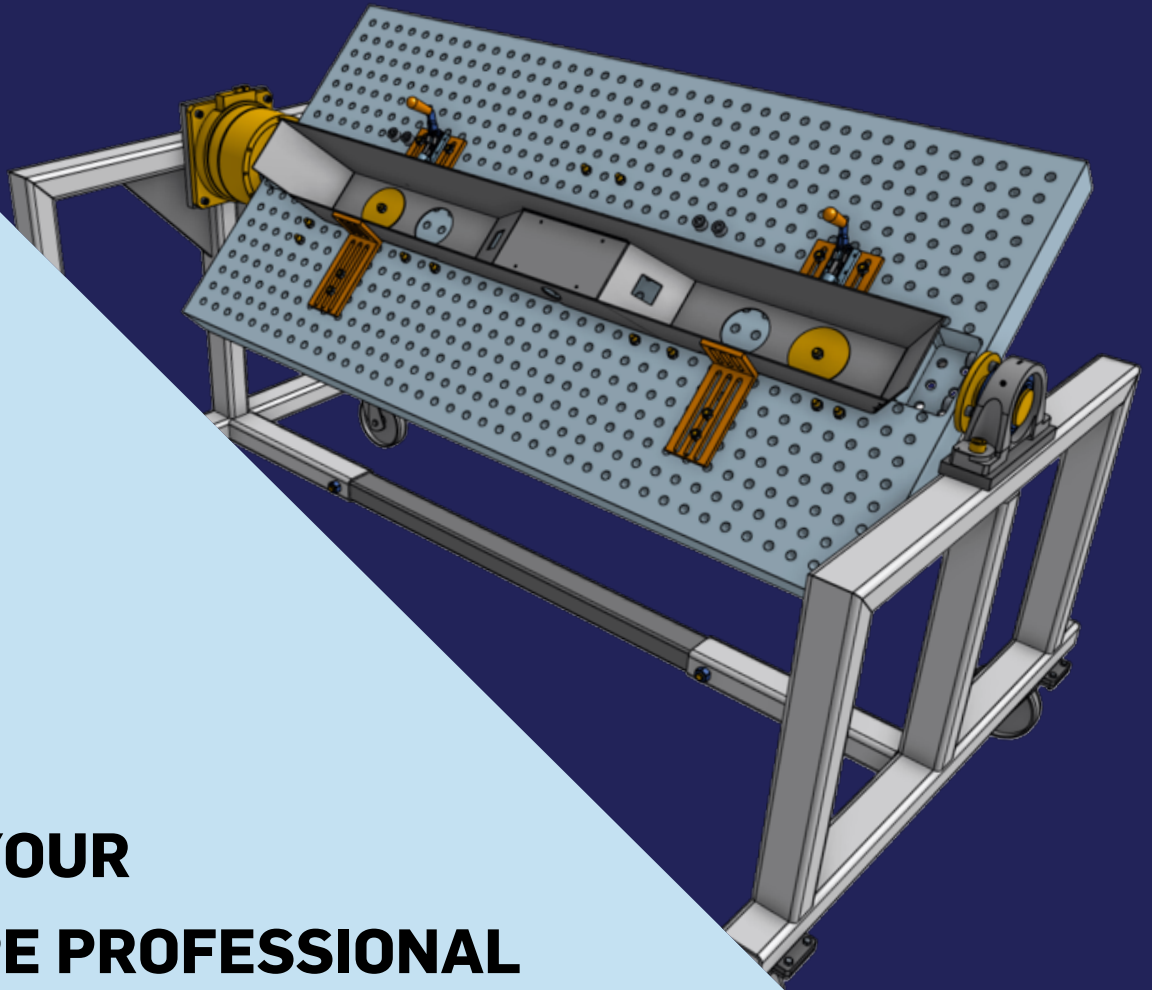
START YOUR ONSHAPE PROFESSIONAL TRIAL

If you'd like to press the reset button and stop feeling blocked by your old CAD system, contact us today for a

14-day Onshape Professional Trial!

Onshape

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