TRANSFORMING ROBOTICS

How 3DEXPERIENCE is Empowering Startups

Stepping Into a Thriving Industry

Startups in today's robotics industry are entering the fray at a pivotal time. The automation and efficiency robotics can provide manufacturers have never been more critical to their success. The market for industrial robotics has grown significantly year over year for a decade. As these machines grow more advanced and their functionality becomes more robust, that growth will likely continue.

However, the technological advancements that have increased demand for robots have also made them more complex—and introduced new design complications for industrial robotics manufacturers. Other aspects of the industry are changing as well. Robot-as-a-service (RaaS) models are changing the dynamics of sales and service, for example. In addition, engineering talent is increasingly difficult for startups to source locally.

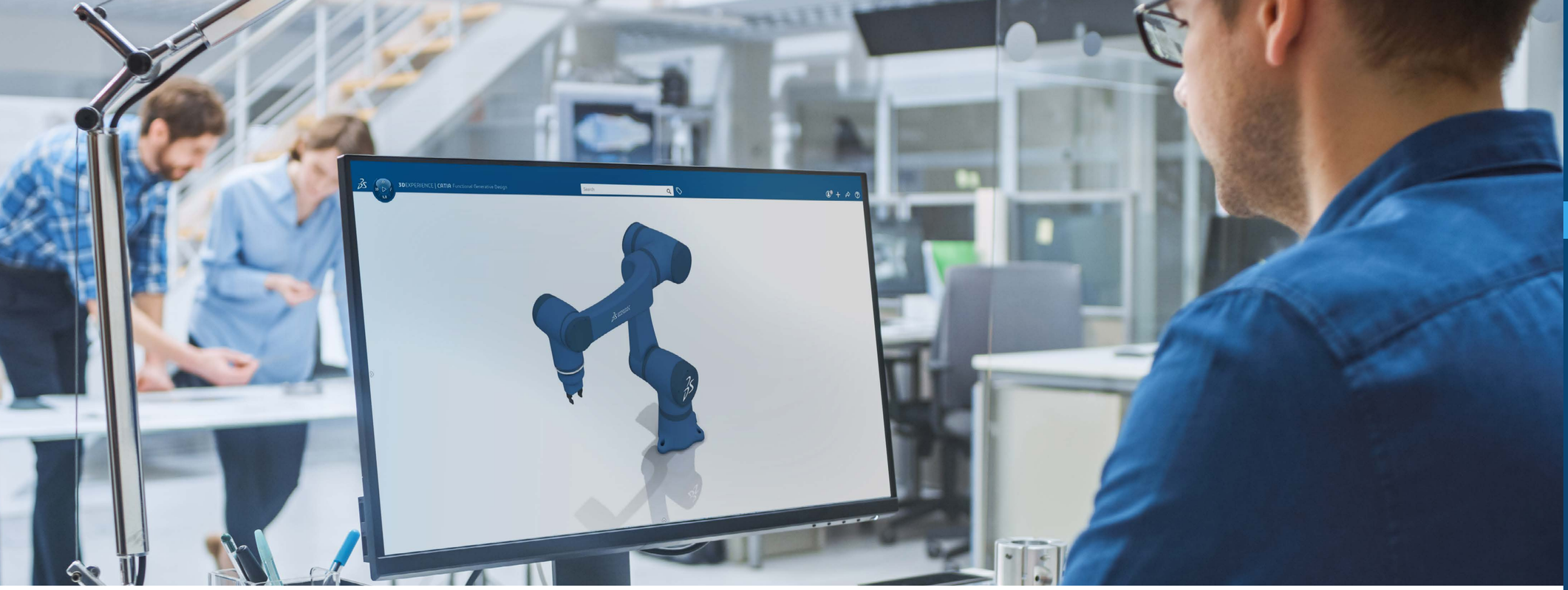
Like their more well-established competitors, industry startups must navigate these issues while also addressing the limitations common to fledgling companies. These companies often operate on smaller budgets and have smaller teams. They may not possess in-house manufacturing capabilities. They may not have expertise in every relevant engineering domain. Yet, robotics startups must still find ways to efficiently manage product development and create the innovative products manufacturers demand. Dassault Systèmes' **3D**EXPERIENCE platform provides the capabilities robotics startups require to do exactly that.

RISING COMPLEXITY PRESENTS NEW CHALLENGES

As in other industries, products in the industrial robotics sector are becoming increasingly complex. Today's robots feature a growing volume of mechanical parts, electronics, electrical components, and software. As product complexity has grown, the importance of coordinating work between domains has become ever more apparent.

Failure to coordinate work effectively increases the likelihood of design errors, which also increases the amount of prototyping and testing required to reach a viable product. Therefore, it is vital that engineers at robotics startups coordinate work as early as possible in the design process. Doing so will reduce the cost and time-intensiveness of prototyping and testing while also improving product quality. But traditional design tools and processes do not often provide efficient methods of coordinating work at that level. Companies are left looking for solutions that do.

The **3D**EXPERIENCE platform can provide the efficiency these companies seek. The platform allows engineering teams to coordinate work across multiple domains from anywhere in the world through the cloud. Design changes in one domain are accounted for and applied automatically across the board, so engineers are always working from up-to-date product information. With **3D**EXPERIENCE engineers can improve their initial designs, bring products to market more quickly, and reduce prototyping and testing costs. For robotics startups, such improvements may represent the difference between success and failure.



SIMPLIFYING REQUIREMENTS ENGINEERING

Establishing clear, comprehensive requirements is critical to developing an effective, purposeful product design. For products as complex as industrial robots, that step is especially vital. Once engineering teams have defined the product's requirements, they must maintain clear traceability between those requirements and the robot's components so that the product is able to function according to its purpose.

Of course, product requirements often change during design. This may happen because customers' needs change or because engineers must accommodate a lack of material availability. Companies have historically managed such requirements changes using spreadsheets, documents, and other shared files. But these traditional methods have their drawbacks. Recording requirements changes manually increases the likelihood of human error, especially given the sheer number of components used in robotics designs. When engineers make decisions based on such errors or outdated information, it can lead to design flaws that may not be discovered until prototyping and testing. At that stage, the design must be revisited, another prototype must be built, and a costly, time-consuming cycle ensues.

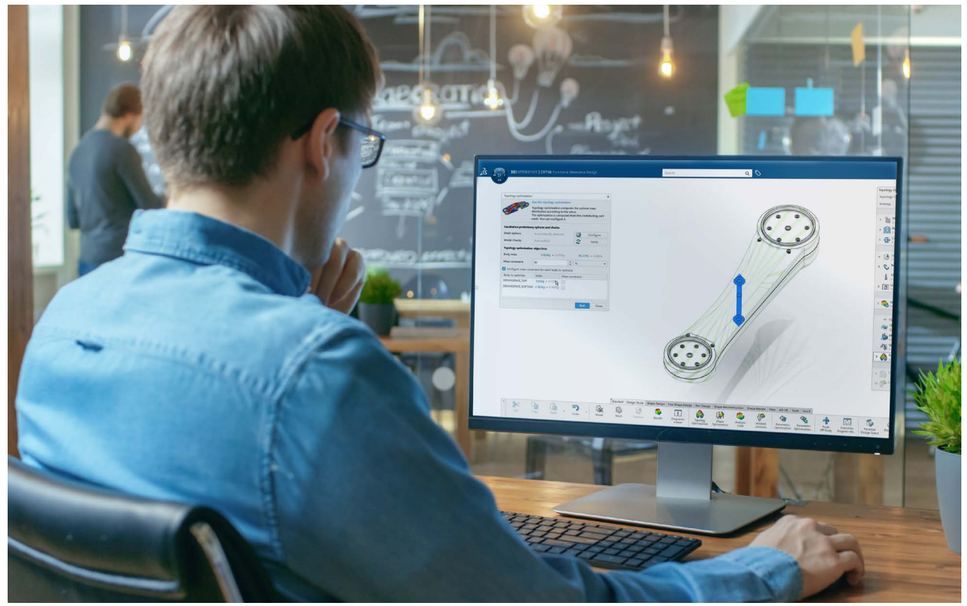
Robotics startups can avoid these issues by utilizing the **3D**EXPERIENCE platform's product lifecycle management (PLM) capabilities. The **3D**EXPERIENCE platform on the cloud simplifies the requirements engineering process, providing stakeholders with end-to-end traceability from requirements to the finished product. When design changes are required, those changes are automatically propagated within the platform in real time. Engineers can rest assured they are always making decisions based on accurate, up-to-date information. As a result, startups can reduce design iterations and eliminate the unnecessary costs that can accumulate as requirements change during design.

THE POWER OF THE VIRTUAL TWIN

One challenge facing robotics startups is the high cost of prototyping and testing, both in terms of money and time. Engineers often do not catch design errors until this stage. Once the errors are identified and addressed, another prototype must be created and tested. Building and testing robotics prototypes is particularly costly and time-consuming due to their complexity and the sheer volume of components they contain.

For young companies eager to keep costs down and reduce time to market, improving the viability of a product's initial design represents a meaningful advantage. However, relying on traditional office tools such as shared documents and spreadsheets to achieve such a design can be difficult.

In the **3D**EXPERIENCE platform on the cloud, users can create a virtual twin that mirrors the design and functionality of a physical counterpart, even if the physical version has not yet been created. The platform's simulation capabilities allow engineers to analyze a design's performance as they develop it. As a result, engineers can make better-informed decisions throughout the process and more quickly arrive at an effective design. This reduces the number of rounds of prototyping and testing required to discover and address any outstanding issues. The end result? Lower costs, more rapid development cycles, far superior sustainability outcomes, and higher product quality.



CREATING COMPELLING SALES AND MARKETING MATERIALS

Designing high-quality products is, of course, not the only concern today's robotics startups have. They must also be able to market and sell those products to potential customers. But many startups have limited resources or few team members dedicated to sales and marketing efforts. Additionally, industrial robotics cannot easily be transported and demonstrated. Shipping them from sales pitch to sales pitch is simply not feasible. At the same time, replacing dynamic product showcases with pages of static marketing materials is not likely to be as effective.

Robotics startups must therefore create compelling marketing assets, sales tools, and other collateral that helps them stand out in a crowded marketplace. Critically, they must also use the resources at their disposal as efficiently as possible.

These companies can use the **3D**EXPERIENCE platform's 3D modeling and virtual twin capabilities to create engaging, interactive demonstrations that demonstrate a product's full range of functionality. These tools allow sales and marketing teams to show in-depth breakdowns of product performance from wherever they are in the world. The platform makes the quotation and sales processes more sustainable by reducing the amount of required travel and eliminating shipping needs.

OPTIMIZING PARTNERSHIPS WITH EXTERNAL STAKEHOLDERS

Most robotics startups rely on outside suppliers and contract manufacturers to support their operations. Coordinating and collaborating effectively with these external stakeholders is a necessary and important part of doing business, but it can also lead to serious difficulties.

One of those issues is a lack of flexibility. When a startup makes a design change that requires a new part, for example, it must communicate that change quickly to avoid higher costs and manufacturing delays. But providing external partners with that kind of visibility can be difficult. Emails can get lost, and shared files can become outdated. If there are no mechanisms for managing important product data, startups can easily find their development and production efforts slowed down or stifled altogether.

The **3D**EXPERIENCE platform on the cloud offers an alternative approach to collaboration that addresses these problems. Robotics startups can use the platform to provide external stakeholders with visibility into design changes. By keeping product data up to date at all times, they reduce the risk of supply-chain or manufacturing errors that introduce costly delays and prolong the product's time to market.

> *"My recommendation to robotics startups is to focus on being very close to their customers, suppliers and partners. They need to be continuously connected to them and offer them a way to collaborate directly. The **3D**EXPERIENCE on the cloud offers a way for all stakeholders to interact digitally, from designers and engineers to marketing team and production partners to the suppliers and the end users. It offers a complete digital infrastructure for all disciplines and is equipped with the most important tools and apps robotics startups need."*

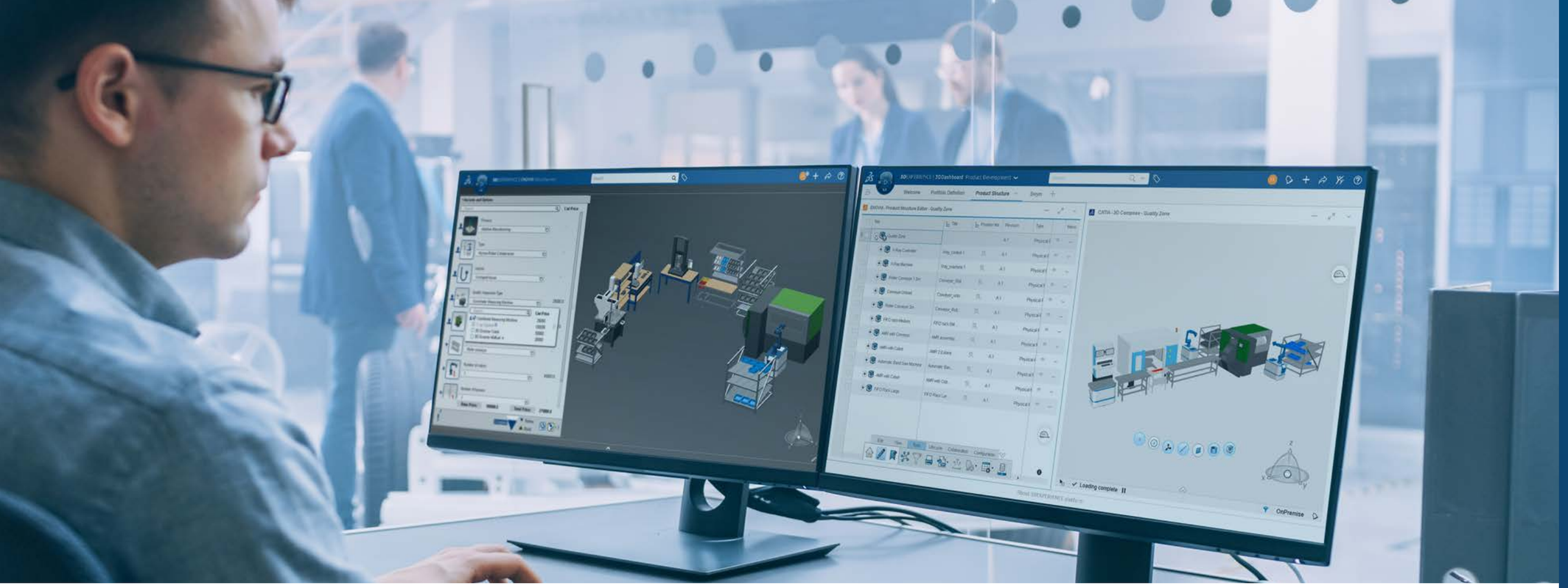
Michael Mayr
Industrial Equipment Sales Strategy Expert,
Dassault Systèmes

EAAS TAKES CENTER STAGE

In addition to a rapidly evolving market, robotics startups also face shifting customer expectations. One such shift is the increased demand for companies to offer their equipment as a service. Equipment-as-a-service (EaaS) agreements place responsibility for achieving equipment uptime and output goals on the equipment owner. This means the equipment owner—in this case, the robotics startup—must track products' performance and perform any required service or maintenance.

However, typical approaches to equipment service and maintenance do not allow for the kind of responsiveness that EaaS agreements demand. Robotics startups cannot respond to equipment failures and unexpected downtime after the fact and expect to provide the level of reliability and performance customers expect from the products they use.

Instead, companies must be able to monitor and address equipment issues much more efficiently than a traditional, reactive approach allows. The **3D**EXPERIENCE platform on the cloud provides a path to that efficiency. It allows companies to gather equipment data in real time via the cloud, identify sources of wear and predict potential failures, and schedule service before an error occurs. Through this kind of predictive maintenance, robotics startups can provide the level of product effectiveness customers demand while reducing service costs. The EaaS approach also makes the product lifecycle more sustainable by reducing travel for service calls and providing field data that robotics startups can use to measure and reduce their products' environmental footprint.



A PATH TO MORE EFFICIENT MANUFACTURING

Designing and manufacturing effective, high-quality products is, of course, central to any robotics startup's success. But given the increased emphasis customers place on optimizing equipment performance, it is not enough to build a good product, hand it off, and wish the customer good luck. Instead, robotics startups must help customers maximize the value of their products. One way startups can do that is by working with customers to optimize the layout of their manufacturing setups to account for robotics placement, ergonomics, and safety.

Of course, this process must happen efficiently to be of actual value. Customers cannot waste time determining optimal equipment placement through trial and error. Because Robotics startups have developed their product with a thorough understanding of the end application, they can better demonstrate how customers can achieve safer, more efficient work environments with minimal effort on the customer's part.

Using the cloud-based **3D**EXPERIENCE platform, robotics startups can design manufacturing layouts tailored to customers' needs, regardless of size or industry. These layouts can factor in the size and movement of the robotics and people on the line to reduce safety risks while maintaining a high level of efficiency. As the customer's operation grows or their needs change, the platform can be used to redesign the setup quickly, which allows customers to minimize shutdowns and resume operations as soon as possible. Thus, startups are able to drastically increase their value to their customers by offering optimized and efficient manufacturing cell and line layouts.

The industrial robotics market is evolving rapidly. The sector's growth represents a significant opportunity for robotics startups, which face their own particular set of challenges in this shifting landscape. As these companies adapt to rapid technological advancements, changing customer expectations, and alternative ways of doing business, they are likely to run up against the limitations of many of the tools traditionally used to manage the product lifecycle. But the 3DEXPERIENCE **platform from Dassault Systèmes can provide the cutting-edge capabilities these companies need to compete alongside their larger counterparts.**

CONCLUSIONS

- Rising product complexity has made the coordination of cross-domain engineering work more vital than ever to keeping costs low and speeding up the design process. The **3DEXPERIENCE** platform uses the cloud to allow stakeholders working remotely to coordinate their efforts from the earliest stages of design, improving product quality and reducing design errors.

- For products as complex as robots, capturing all product requirements andensuring traceability throughout design is crucial to efficient product development. The cloud-based **3DEXPERIENCE** platform's robust functionality allows engineers to manage that kind of vital product data and ensure that engineering decisions are made based on accurate information.

- The **3DEXPERIENCE** platform also offers 3D modeling, virtual twin, and simulation capabilities that allow robotics startups to simulate product behavior from early in the design process. In this way, they can improve initial designs and reduce the cost and time-intensiveness of prototyping and testing.

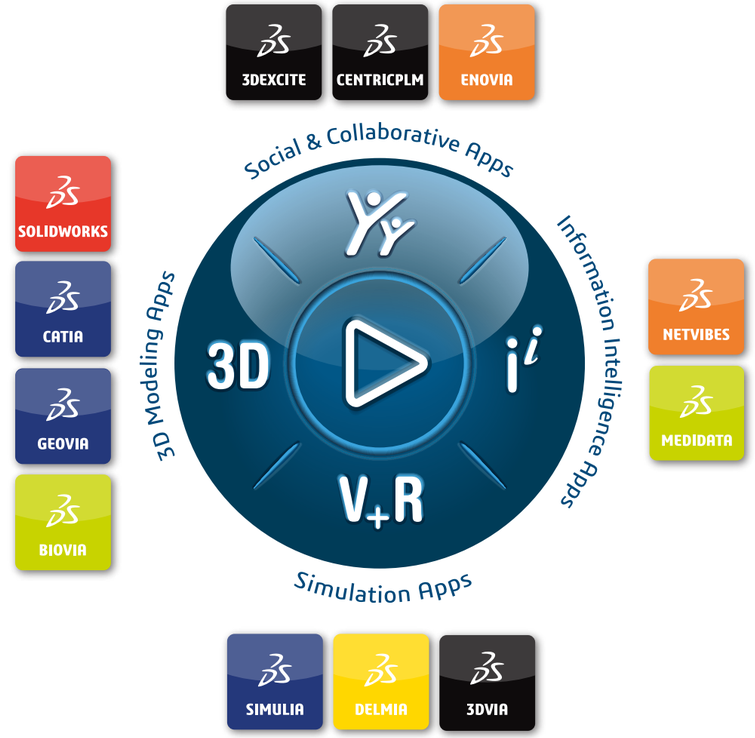
- These capabilities also allow robotics startups to demonstrate the full functionality of their products in a virtual setting. Companies can create more engaging sales and marketing presentations and materials while also reducing travel costs and improving the sustainability of their sales process.

- EaaS agreements are becoming increasingly popular with customers. Robotics startups can leverage the **3DEXPERIENCE** platform's cloud capabilities to execute EaaS agreements more effectively by predicting service needs, minimizing unplanned downtime, and improving output.

- Robotics startups can add even more value for customers by using the **3DEXPERIENCE** on the cloud.

To learn more about product development on the 3DEXPERIENCE platform on the cloud, visit our website :

3ds.com/cloud



Our **3D**EXPERIENCE® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE** Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating Virtual Twin Experiences of the real world with our **3DEXPERIENCE** platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 300,000 customers of all sizes, in all industries, in more than 135 countries. For more information, visit **www.3ds.com**.

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