



# MECHANICAL DESIGN & ENGINEERING WITH 3DEXPERIENCE CATIA

Create complete advanced mechanical projects

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design  
automation

Design for manufacturing

## REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA

# INTRODUCTION



A changing world is placing greater demands on the engineering process. Products and experiences are getting more complex, while performance and quality targets are becoming more demanding. **3DEXPERIENCE CATIA** enables engineers to meet these challenges by rapidly developing high-quality mechanical products.

Mechanical engineers equipped with CATIA 3D Modeling tools can gain insights into key factors of quality and performance early in the product development phase. Digital prototyping, combined with digital analysis and simulation, allows product development teams to virtually create and analyze a mechanical product in its operating environment.

CATIA powered by the **3DEXPERIENCE** platform on the cloud enables engineers to create any type of 3D assembly in a highly productive and intuitive environment, for a wide range of engineering processes.

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design automation

Design for manufacturing

### REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA



# AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

**3DEXPERIENCE CATIA** allows you to create anything you want without limits.

CATIA geometrical modeler lets you complete highly complex mechanical products and parts with great accuracy, from concept to detailing.

To that end, the most comprehensive process coverage is available, including high-quality surface and part design, assembly creation, mechanism motion, 3D mock-up review and drawing generation.

With **3DEXPERIENCE CATIA** you are sure to get the best geometry accuracy for part and tooling surfaces. It also guarantees you the highest level of performance even if you work on very heavy models with thousands of features or parts.

- Increase your mechanical & advanced shape product design quality.
- Work on large assemblies with flexibility.
- Accelerate detailed design of the rough parts and check the feasibility to ensure the manufacturing requirements are met.
- Design and animate complex kinematic mechanisms.
- Accelerate your design process with natural manipulations and contextual interactions.
- Reduce time-to-market by designing right the first time.

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design  
automation

Design for manufacturing

## REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA

## ALTERNATIVES EXPLORATION

CATIA geometrical modeler is very stable, particularly during updates and design modifications, so you can increase the number of studies for complex mechanism design and simulation alternatives. Explore different iterations very easily and very quickly to enrich your designs.

**3DEXPERIENCE** CATIA makes it easy to explore innovative solutions and workable concepts for detailed design.



### Advanced Surface Design

Advanced Surface Design will help enrich your mechanical products with sophisticated and high-quality shapes.



### Associative Drawings

The Associative Drawings feature allows you to generate associative layouts with multi-views, dimensions, and an associated bill of materials.

## KNOWLEDGE DESIGN AUTOMATION

Thanks to a set of what we call knowledgware applications in CATIA, you can capture and reuse your best practices to make your work faster and easier. CATIA's simple and very lean knowledgware language lets you automate repetitive tasks. You can also create templates to store your company's intelligence and expertise within specific 3D models that can be reused in different contexts.

Imagine you're designing a set of gears. You can easily create a template from a highly parameterized model and then reuse it with different parameters and in different contexts. You can also create a template for the whole gearbox so you get all of the axes and the different gears. And when you instantiate this template, you just select the different dimensions, the different ratios between the speed of the gearbox, and the names of the different parts. In just a few clicks you're able to create this gearbox. You can also define in the templates some checks to make sure that everything is compliant when you instantiate the template.

**You can accomplish repetitive tasks quickly and easily with knowledgware. Store and reuse complex parts and products created by experts, then create specific rules so all the products you design are compliant with your company's design standards.**

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design automation

Design for manufacturing

### REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA

## DESIGN FOR MANUFACTURING

Whatever your manufacturing process, you can take manufacturability constraints into account from the start. Most of the time you get a specific application depending on the type of part you want to create, or at least specific functions. . For plastic parts, for example, there's a specific app for designing and a specific app for simulation. For cast and forged part there's a list of dedicated functions within part design. There are specialized applications for sheet metal as well.

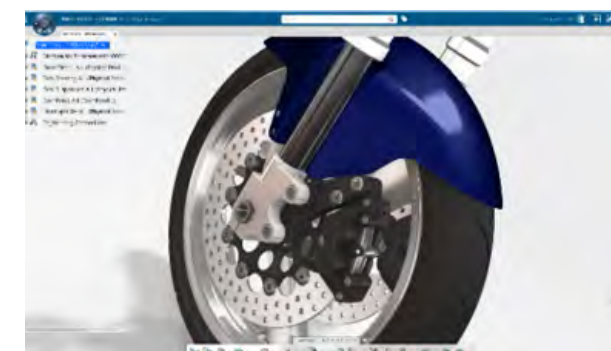


When your design is done you can validate the manufacturability thanks to add-on analysis tools. Here are a few examples of useful features:

- **For machined parts** - surface curvature analysis and a wall thickness analysis directly from the 3D will ensure you that your parts can be manufactured.

- **For sheet metal parts** you will be able to show the unfolded view of your parts, and create the bend order process.
- **In plastic parts** you can create a reserved area for components, combine complex geometric operations with advanced design features or get a plastic filling simulation performed directly on your 3D design mode.
- **For cast and forged parts**, you can take advantage of the auto-filleting function to create all the part fillets, as well as using draft analysis and wall thickness analysis.
- **For 3D printed parts** - create the tessellation and generate an STL file with the different elements to be sent directly to the 3D printer.

With the **3DEXPERIENCE CATIA**, account for manufacturability constraints at the early design stage and validate the manufacturability of your design with advanced analysis tools.



## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design automation

Design for manufacturing

### REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA

# REAL-TIME COLLABORATION

Efficient and seamless collaboration is essential in every team. With **3DEXPERIENCE CATIA**'s powerful database platform, colleagues, suppliers and external partners can innovate together more efficiently and effortlessly. This results in compressed cycle times and fewer late changes.

With **3DEXPERIENCE CATIA** you and your team are always sure to access and share the latest version of your data. Different stakeholders are able to work in parallel on the same project, and save their modifications at the same time.

If you need different stakeholders to have different access rights, you can do that too. Whether they are reviewers or providers, they will see only the parts they need for their work but will not see the overall product. They can have some read rights on some parts and some modify rights on some other parts. You can easily manage all access rights on the platform. If you want to add people who are external to your project at a later date, it's also easy to do this thanks to the simple user and license management in the platform.

- Work in parallel on the same product and share your 3D models easily.
- Enable product review: detect and track interferences, check the weight distribution and analyze the digital mock-up with relevant engineering data.
- Create product manufacturing information through the full definition of 3D tolerances and annotations in the same model.
- Protect engineering intellectual property by securing access to your projects based on different profiles.
- Scale depending on your needs.

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design automation

Design for manufacturing

## REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

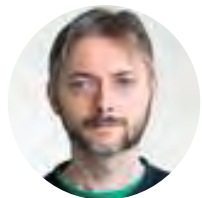
### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA



*The unified 3DEXPERIENCE user environment allows us to collaborate efficiently not only within the internal team but also with part suppliers.*

*With the cloud, we can develop much faster and reduce the number of errors we make from incorrect versioning. We also like that configuration management and commenting functionality is interlinked with modules so we can measure the lifecycle of all the different components of our product.*



Michal Illich,  
Founder and CEO, Zuri

Czech-based startup Zuri plans to revolutionize the way people travel by making air transportation more accessible and efficient. The company adopted the 3DEXPERIENCE platform on the cloud to design and produce its VTOL aircraft, create a virtual experience twin and connect all stakeholders.

As it brings its VTOL hybrid plane to life, Zuri needed an industry-standard design and product development platform to replace the various design tools being used across the organization, connect its disciplines and scale with the business. The 3DEXPERIENCE platform on the cloud was an ideal fit.

Zuri continues to explore the full potential of the 3DEXPERIENCE platform but is already using CATIA to handle the early stages of final product development for initial analysis, aerodynamics and measurements.

*"CATIA is the worldwide standard in aircraft design" Illich said.*

*"And the cloud version is ideal for a startup like us to benefit from the same solution that bigger players in our industry are used to working with. It allowed the team to start immediately, without the need to equip the company with an expensive IT infrastructure and to flexibly change the structure of the applications according to our changing needs. We like that everybody can securely work on the platform from any device connected to the internet, share data and have data versioning under control."*

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design automation

Design for manufacturing

### REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

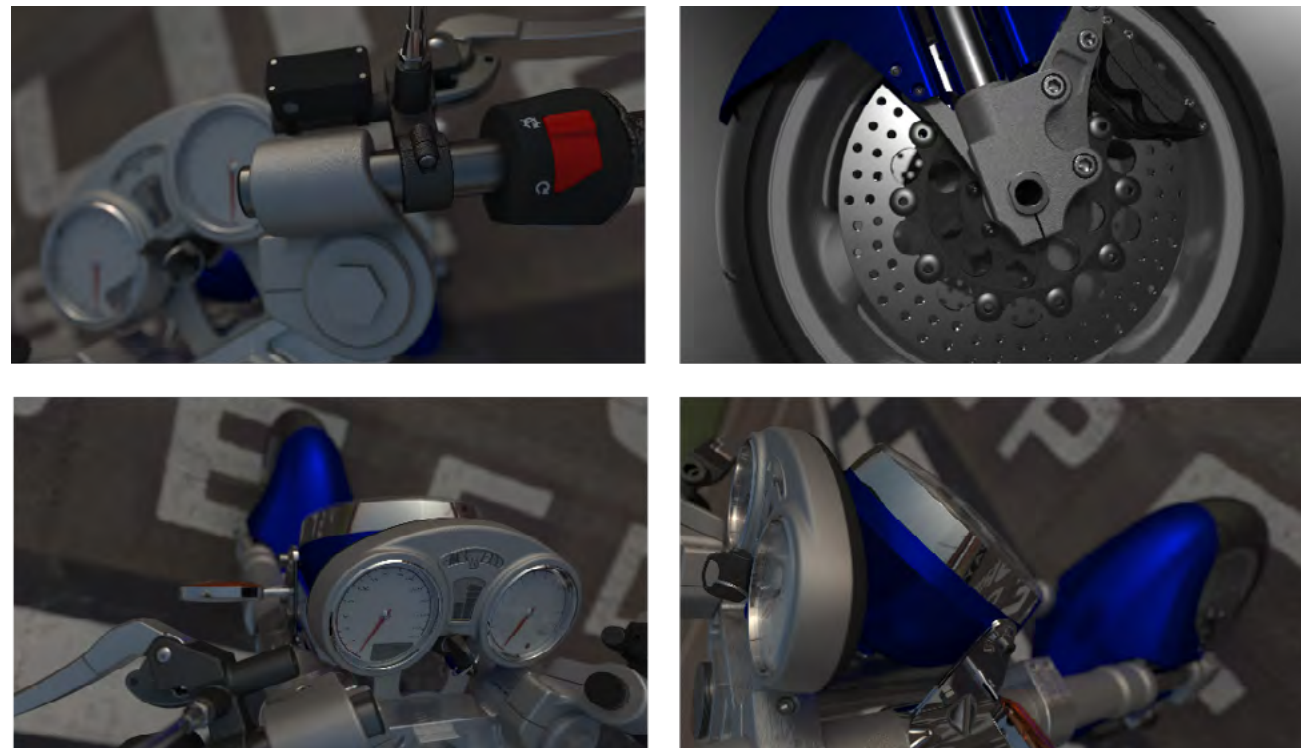
### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA

# WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

CATIA, powered by the **3DEXPERIENCE** platform, enables startups and engineering companies to achieve engineering excellence via its powerful array of social and collaborative 3D modelling and simulation tools.

Take a look at the infographic and watch the demo below to find out more.



**In short, 3DEXPERIENCE CATIA provides you with a great user experience:**

- Intuitive user interface: make selections in 3d and receive user guidance.
- Simple to use: accomplish design tasks in a few clicks, with very low mouse mileage. Optional easy UI customization.
- Fast and high quality display.
- Advanced modeling capabilities.

**All types of users can benefit from it:**

- For casual users, **3DEXPERIENCE CATIA** is easy to use.
- For expert users, **3DEXPERIENCE CATIA** is very productive.
- For existing CATIA V5 users, **3DEXPERIENCE CATIA** is very quick to learn and master.
- 20% to 50% higher productivity in solid and surface modeling.

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design automation

Design for manufacturing

## REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

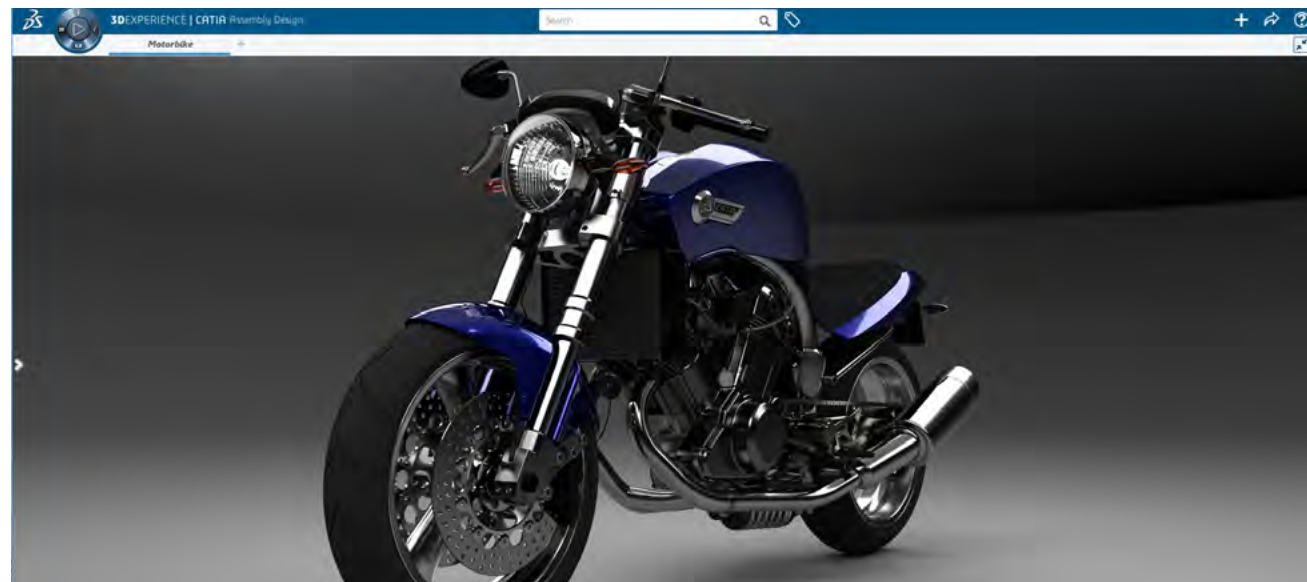
### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA



# FIND THE RIGHT SOLUTION FOR YOUR NEEDS

3DEXPERIENCE CATIA has a large portfolio of Mechanical Design and Engineering solutions. Find the one that fits your needs!



## Mechanical & Shape Designer

- Check & repair surfaces with regard to CATIA modeling criteria.
- Quickly model both simple and complex shapes using wireframe and surface features.
- Optimize tooling shapes from simulations or measurements.
- Provide creative designers with all the necessary tools to dynamically create & analyze freestyle shapes.
- Achieve high-end surface quality thanks to local surface modifiers and global deformation.

[Learn More](#)



## Mechanical Designer

- Create 3D parts using advanced solid modeling capabilities.
- Simulate assembly kinematics.
- Define tolerances on 3D models using an advisor tool for standard compliance.
- Review & filter 3d tolerancing information in a web- based environment.
- Evaluate the response of a complex structure under static loads.

[Learn More](#)

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design automation

Design for manufacturing

## REAL-TIME COLLABORATION

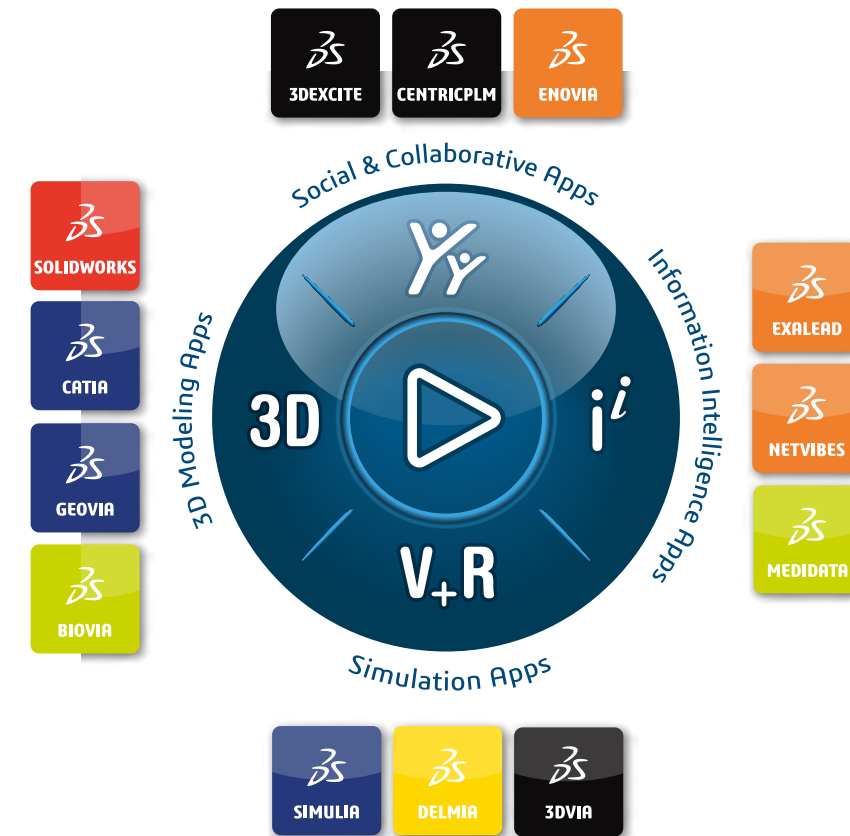
### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA

## GET STARTED WITH 3DEXPERIENCE CATIA

- Create any type of 3D part, from rough 3D sketches to fully detailed industrial assemblies.
- Unbreakable relational design — a new way to manage links between objects and related behaviors in configured assemblies.
- Enables a smooth evolution from 2D - to 3D-based design methodologies.
- Productive and consistent drawing update removes the need for additional user operations.
- Process oriented tools capture the manufacturing process intent in the early stages of design.
- A wide range of applications for tooling design, for generic tooling in addition to mold and die.
- Advanced technologies for mechanical surfacing, based on a powerful specification-driven modeling approach



### Ready to learn more about 3DEXPERIENCE CATIA on the cloud?

Request a live demo today

Inceptra supports engineering and manufacturing organizations with best-in-class solutions to digitally design, simulate, produce, and manage their products and processes, enabling enhanced innovation and productivity.

As the largest Platinum partner in North America, Inceptra is dedicated to Dassault Systèmes' product development software portfolio, complementary solutions, and related services, including training, implementation, integration, support, consulting, and automation services. For more information, please visit [Inceptra.com](https://www.inceptra.com).



**North America Headquarters**  
1900 N. Commerce Parkway,  
Weston, Florida, 33326  
USA  
Phone (954) 442-5400

©2020 Dassault Systèmes. All rights reserved. 3DEXPERIENCE, the Compass icon, the 3DS logo, CATIA, BIOVIA, GEOVIA, SOLIDWORKS, 3DVIA, ENOVIA, EXALEAD, NETVIBES, MEDIDATA, CENTRIC PLM, 3DEXCITE, SIMULIA, DELMIA, and IFWE are commercial trademarks or registered trademarks of Dassault Systèmes, a French "société européenne" (Versailles Commercial Register # B 322 306 440), or its subsidiaries in the United States and/or other countries. All other trademarks are owned by their respective owners. Use of any Dassault Systèmes or its subsidiaries trademarks is subject to their express written approval.

#### Europe/Middle East/Africa

Dassault Systèmes  
10, rue Marcel Dassault  
CS 40501  
78946 Vélizy-Villacoublay Cedex  
France

#### Asia-Pacific

Dassault Systèmes K.K. ThinkPark  
Tower  
2-1-1 Osaki, Shinagawa-ku, Tokyo  
141-6020  
Japan

#### Americas

Dassault Systèmes  
175 Wyman Street Waltham,  
Massachusetts 02451-1223  
USA

## INTRODUCTION

### AN END-TO-END PROCESS FOR MECHANICAL & SHAPE DESIGN

Alternatives exploration

Knowledge design automation

Design for manufacturing

### REAL-TIME COLLABORATION

### WHY SHOULD YOU CHOOSE 3DEXPERIENCE CATIA?

### FIND THE RIGHT SOLUTION FOR YOUR NEEDS

### GET STARTED WITH 3DEXPERIENCE CATIA