

HOW TO RAPIDLY TURN YOUR VISION INTO REALITY

6 Steps of the Idea-to-Reality Product Development Process



INTRODUCTION

STEP 1:
HARNESS YOUR INSPIRATION

STEP 2:
REFINE YOUR CONCEPT

STEP 3:
MANAGE YOUR PROJECT

STEP 4:
BUILD UP YOUR MODEL

STEP 5:
INTEGRATE MANUFACTURING
PROCESSES

STEP 6:
SHARE YOUR CREATION
WITH THE WORLD

CONCLUSION

INTRODUCTION

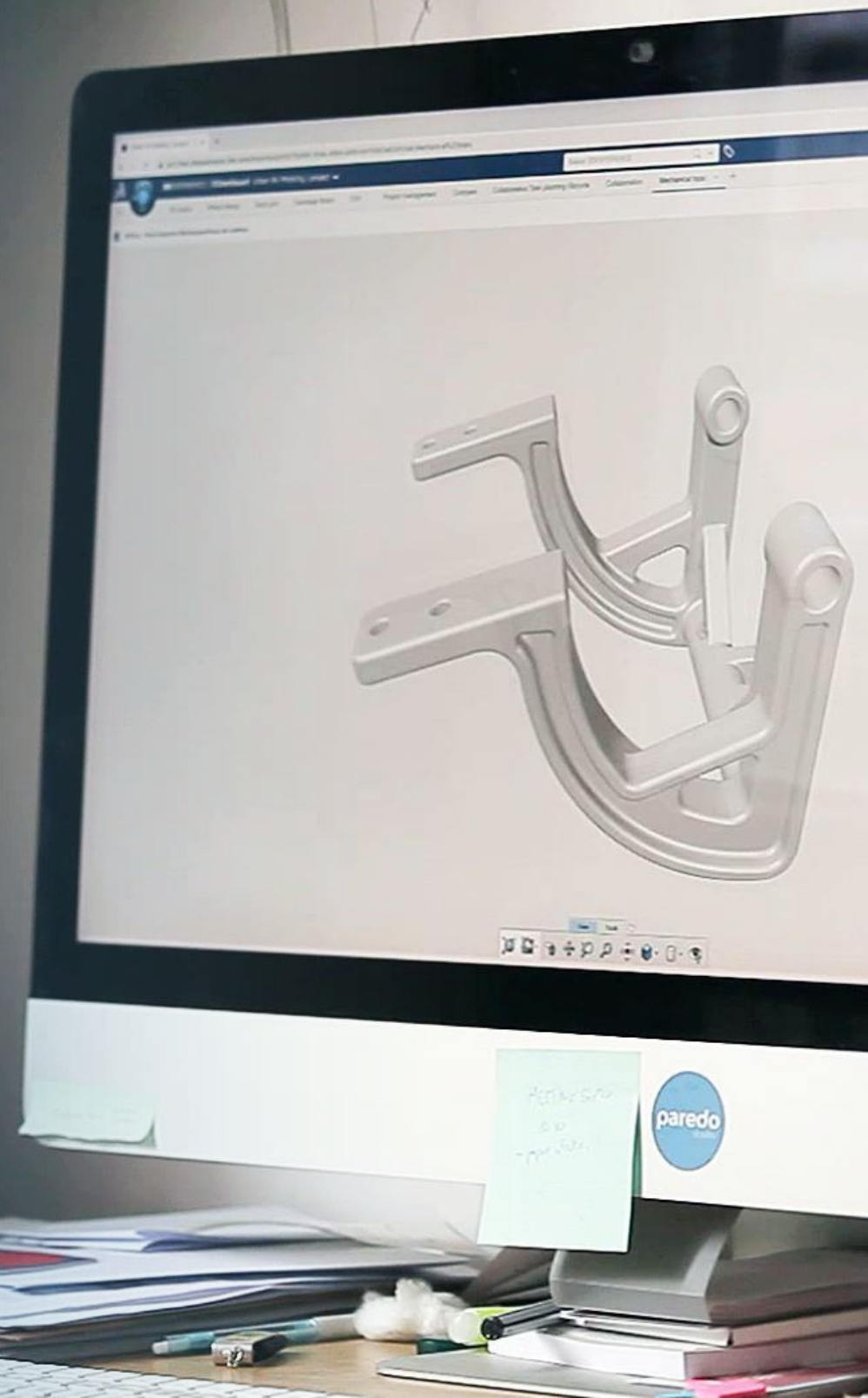
All too often, designers come up with fantastic ideas that never get a chance to see the light of day.

But it's not because the ideas are too far-fetched or fundamentally flawed. The problem usually lies in the lack of a stable product design framework.

Without a unified system **to seamlessly move a concept from design to engineering** and so on, unnecessary friction is introduced at each stage of the development lifecycle. Sometimes all it takes is a small bit of resistance—an omission of input, a versioning error, or a manual hurdle—to stop even the best idea in its tracks.

In this guidebook, you'll learn how design teams can work within a single secure environment, integrating all the tools necessary to sketch, detail, socialize, manage, collaborate, design, engineer, simulate, iterate and issue factory-ready manufacturing instructions for your most ambitious creations.

Powered by the **3DEXPERIENCE®** platform on the cloud, this **6-part framework** has successfully brought countless futuristic products from concept to factory floor and, in the process, brought the future itself closer to the here and now.



INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD


CONCLUSION


STEP 1


HARNESS YOUR INSPIRATION


Designers are uniquely equipped to push the boundaries of the status quo, to respond to society’s problems in innovative ways. When challenges arise, it takes creative thinkers to push up against existing constraints and develop innovative solutions.


Sketching is a reliable strategy to quickly give shape to an idea. From the start, sketch using an application that helps you style your design and explore its feasibility with a clear pathway to development and production.


 Explore one or more of those apps in **3DEXPERIENCE** for this step:



xDesign



xShape

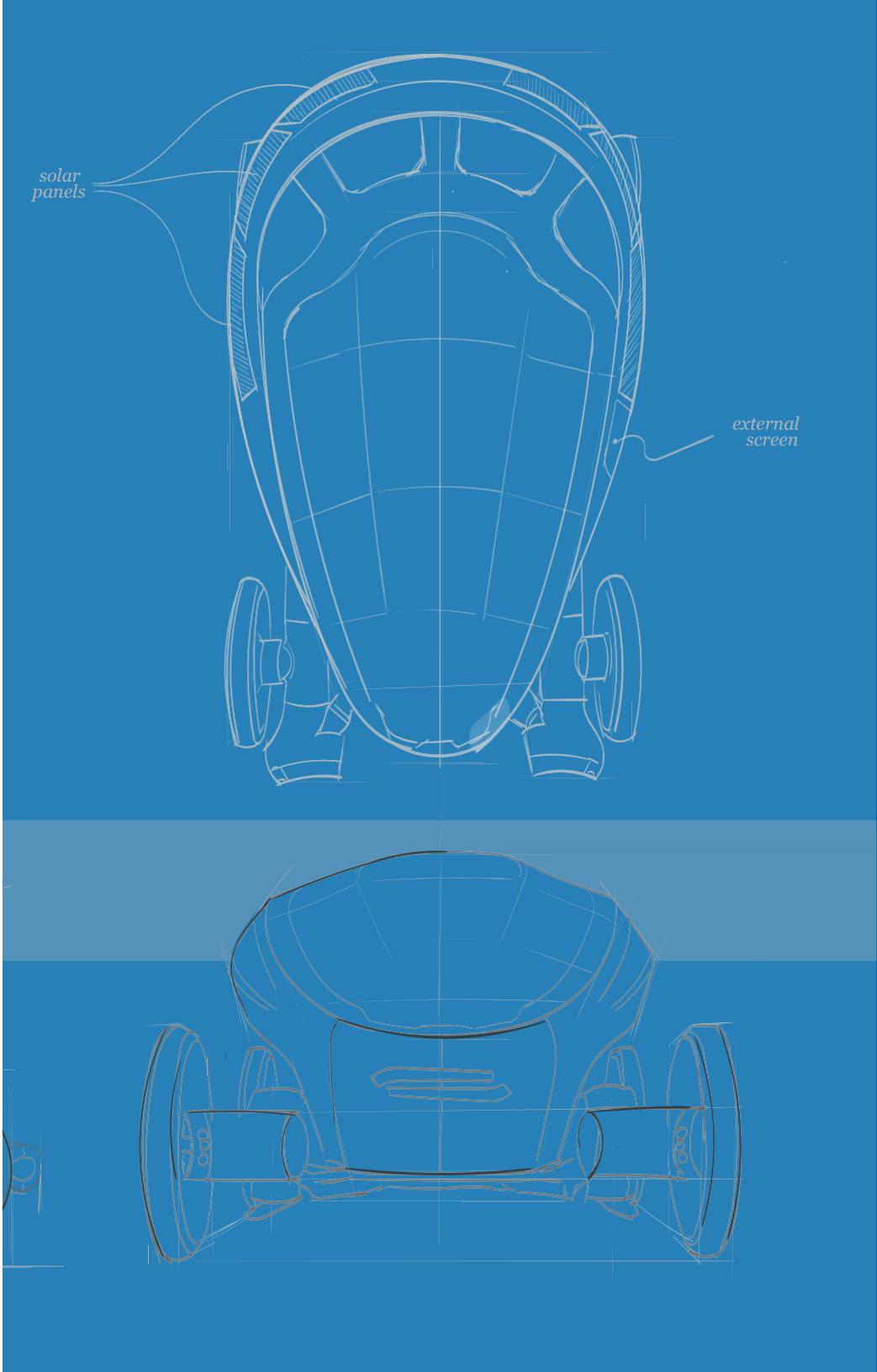
 Imagine & Shape


Natural Assembly


Natural Shape

 Live Rendering

 Natural Sketch



INTRODUCTION

STEP 1:
HARNESS YOUR INSPIRATION

STEP 2:
REFINE YOUR CONCEPT

STEP 3:
MANAGE YOUR PROJECT

STEP 4:
BUILD UP YOUR MODEL

STEP 5:
INTEGRATE MANUFACTURING
PROCESSES

STEP 6:
SHARE YOUR CREATION
WITH THE WORLD

CONCLUSION



IDEA-TO-REALITY USE CASE

DESIGNING THE EMERGENCY TRANSPORT VEHICLE OF THE FUTURE

Major forces like climate change, health crises, water insecurity and more have inspired inventors from a wide range of industries to develop solutions for meeting an array of urgent needs.

For example, at the height of the COVID-19 pandemic, a team composed of a product designer, mechanical engineer, and doctor collaborated virtually on a solution to rapidly and safely transport patients from home to hospital.

The concept of an autonomous flying rescue vehicle was born. While it could have stopped there with a sketch, this kernel of inspiration was captured on the 3DEXPERIENCE platform on the cloud and moved seamlessly to the next phase of the product development lifecycle.

INTRODUCTION

STEP 1:
HARNESS YOUR INSPIRATION

STEP 2:
REFINE YOUR CONCEPT

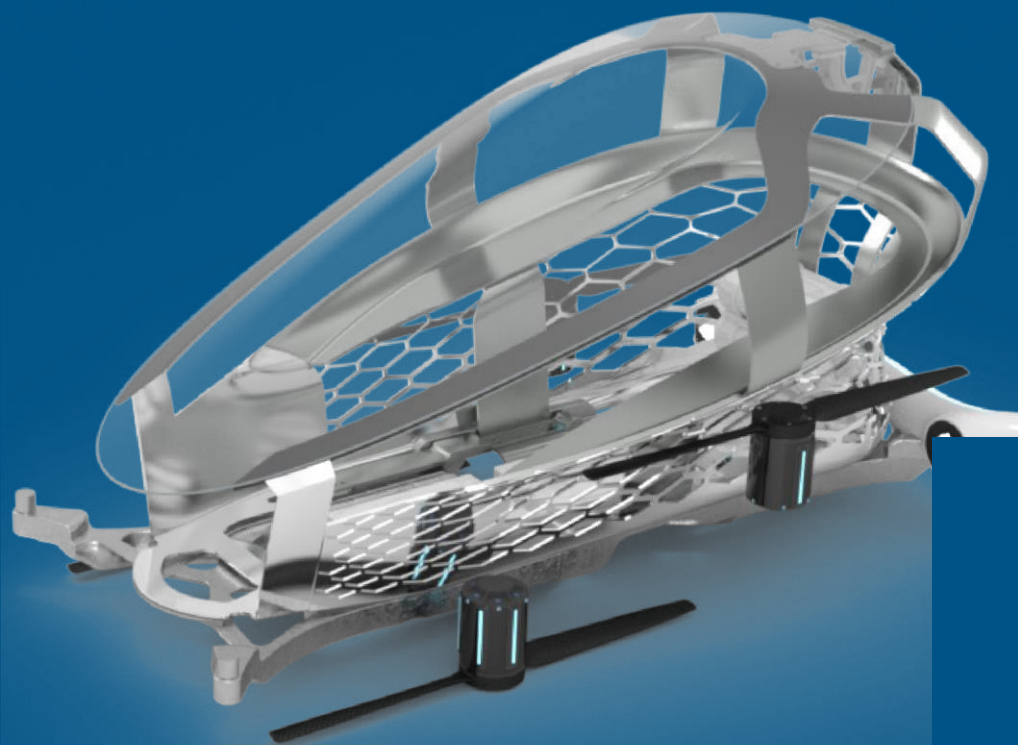
STEP 3:
MANAGE YOUR PROJECT

STEP 4:
BUILD UP YOUR MODEL

STEP 5:
INTEGRATE MANUFACTURING PROCESSES

STEP 6:
SHARE YOUR CREATION WITH THE WORLD

CONCLUSION



STEP 2

REFINE YOUR CONCEPT

Add definition to your creation using graphical visual scripting and interactive 3D modeling applications. Keep in mind, once your design is pressure-tested downstream by various engineers, users, and the laws of physics, you'll want to circle back to the design to adjust some parameters.

Therefore, for maximum **precision and speed**, parametric design tools must integrate natively with project management, mechanical engineering and simulation applications. When you're ready to implement multi-disciplinary feedback, there will be no design rework required or time wasted.

In our autonomous flying rescue vehicle example, the designer applied computational design principles to create a series of design options. The 2D idea evolved into a high-level 3D model that was primed to gather feedback from project stakeholders.



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INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

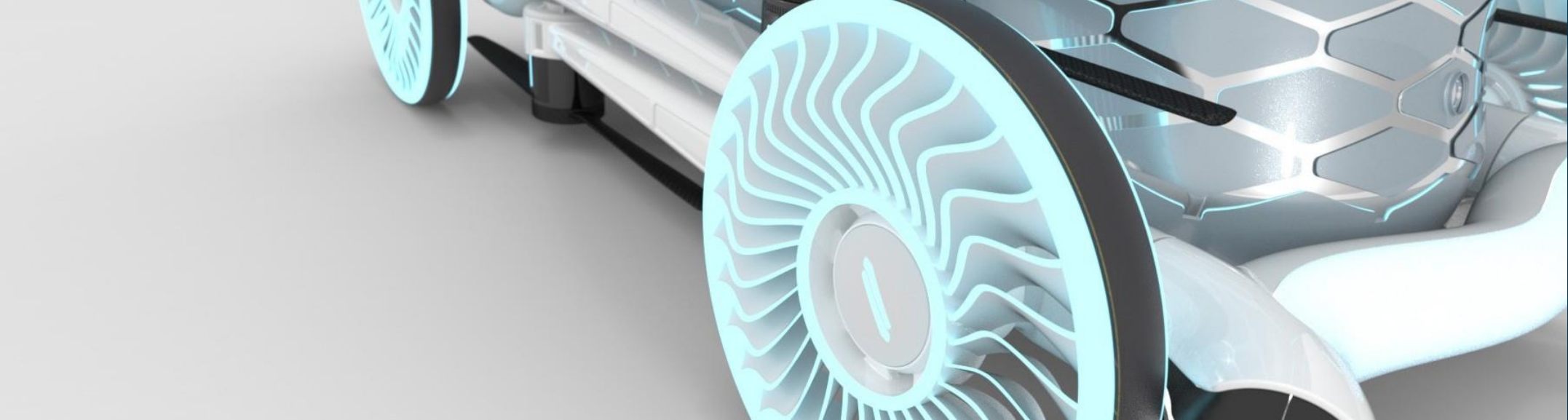
STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION



Computational Design

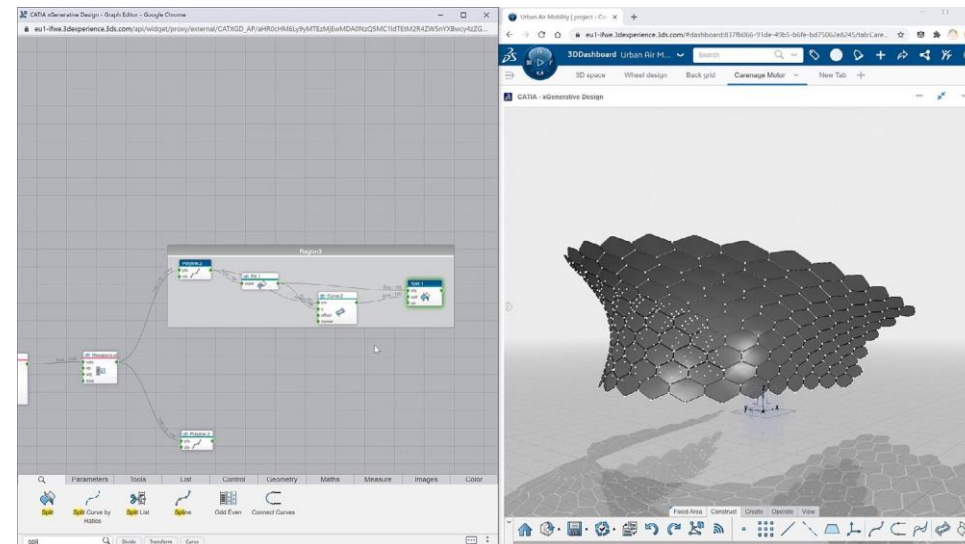
Use a computational design tool to form complex, irregular and repetitive shapes and patterns through a simple set of inputs.

In such an application, changing a parameter will regenerate your design automatically, offering an expansive new set of geometries to consider.

Algorithmically-based parametric modeling tools such as CATIA xGenerative Design application offer increased **variability and control over the design**. Responsiveness to changing criteria make parametric models especially useful for design exploration.

The UI is based on intuitive, interactive, visual controls rather than text-based scripting and coding. Plus, no specialized hardware or expensive workstations are necessary with a cloud-based solution.

When organic or biologically-inspired shapes are called for, an algorithmic design approach produces patterns which **emulate nature's algorithms**. Such patterns would be almost impossible using a conventional design approach. All the while, the algorithmic generative design tool respects the specifications of your vision.



Create complex and bio-inspired shapes with generative patterns

INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION

STEP 3

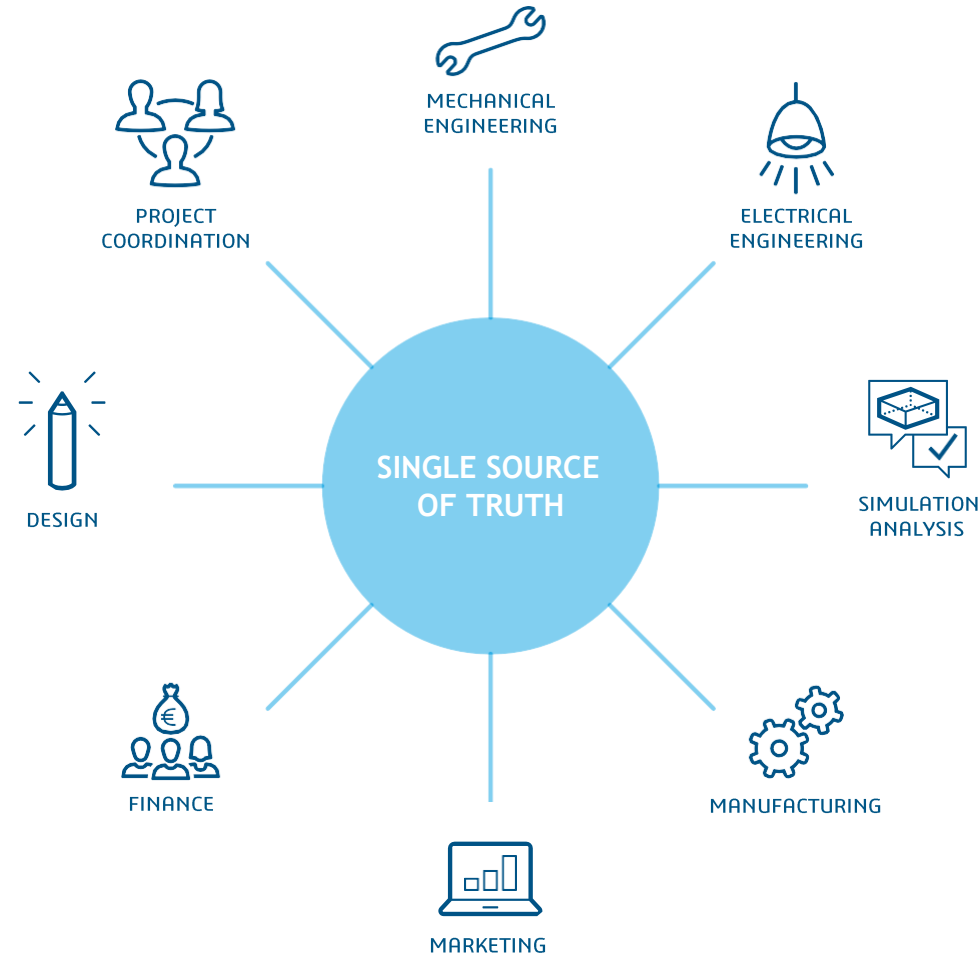
MANAGE YOUR PROJECT

It clearly takes a team to bring an idea to life. **Solicit early validation** from specialists across multiple disciplines to make a design model stronger.

Working with a range of collaborators also establishes a familiar foundation for the rest of the product development lifecycle, when you will find yourself working with engineering and fabrication partners to bring a prototype to life.

So far, a designer has sketched and explored design variations mostly independently. It's time to solicit concrete feedback through a collaborative yet controlled environment.

Project contributors that represent design engineering, manufacturing engineering, quality assurance, sales, procurement and management will all have practical input. Market insights also assist in shaping a product that customers really want. Bring everyone together early in the process to **collaborate in real time** on the single source of truth.



INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

STEP 3: MANAGE YOUR PROJECT

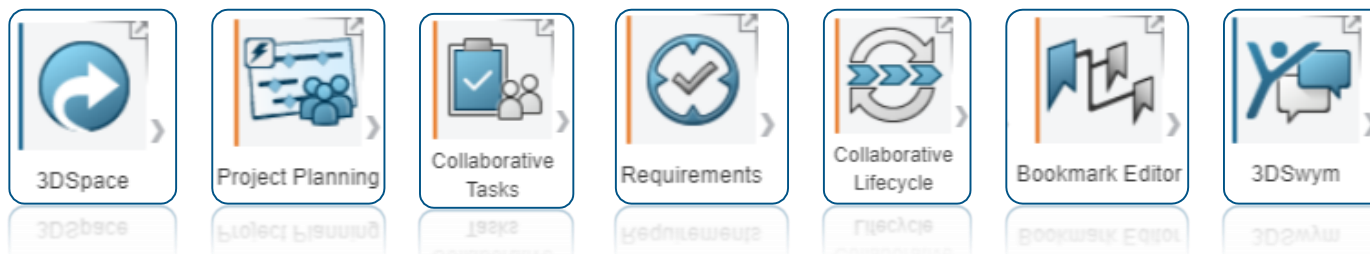
STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION

Explore one or more of those apps in **3DEXPERIENCE** for this step:



Controlled Collaboration

Create a secure collaborative space for sharing information, coordinating resources, and keeping the project on schedule and in scope. Disparate IT systems are no longer an obstacle you need to grapple with.

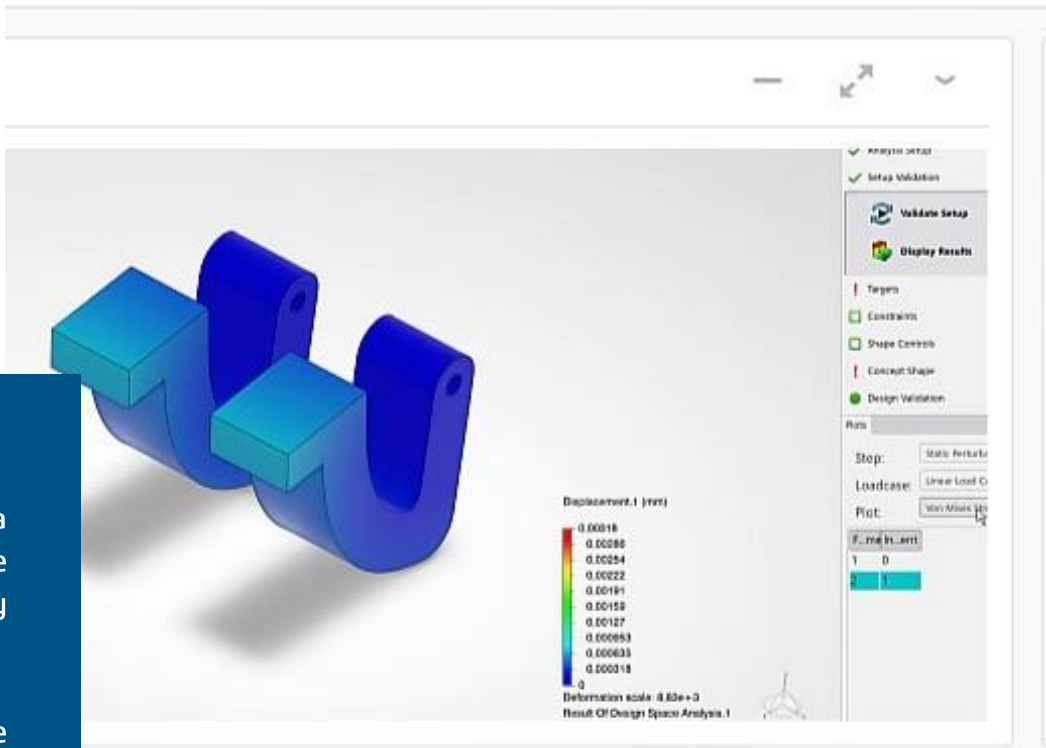
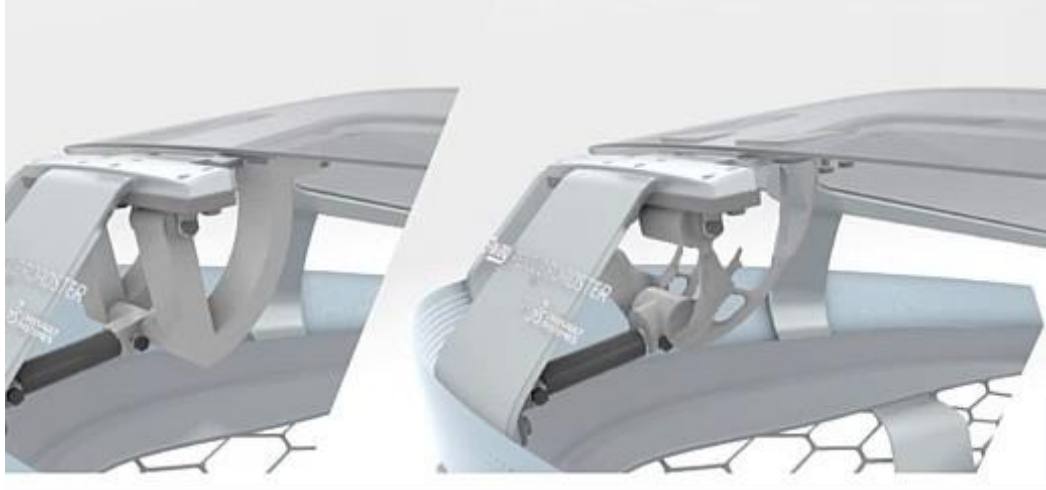
ENOVIA solutions (such as *Collaborative Business Innovator*, *Collaborative Industry Innovator*, *Project Planner*, and *Project Manager*) serve as the project backbone for the **3DEXPERIENCE** platform on the cloud. All stakeholders seamlessly work together on a single product definition.

The project manager creates and assigns key tasks, deliverable dates, review cycles and approvals, and sets parameters to flag risks to the budget or timeline.

Idea-to-Reality Use Case (continued)

A product designer, a medical doctor, a mechanical engineer, and a simulation analyst all contributed to the development of the autonomous flying rescue vehicle. And during the pandemic, by necessity, it was a virtual collaboration.

The team worked within the same environment, accessing real-time data, easily viewing all issues in their various stages, with priorities attached to each one. This process saved a significant amount of time and effort as key decisions were made.



A collaborative lifecycle workflow in action

INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION

Virtual Reality

A robust VR environment opens up the engineering process to non-technical decision makers for rapid validation cycles. They can **experience the product** in a more visceral way, partake in rich discussions, provide more informed feedback, and make better product decisions.

Invite stakeholders to connect through an application such as *Immersive Collaboration Experience*. Users access the secure model from anywhere in the world. All comments, flagged issues, and design changes are tracked automatically for full traceability.



INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

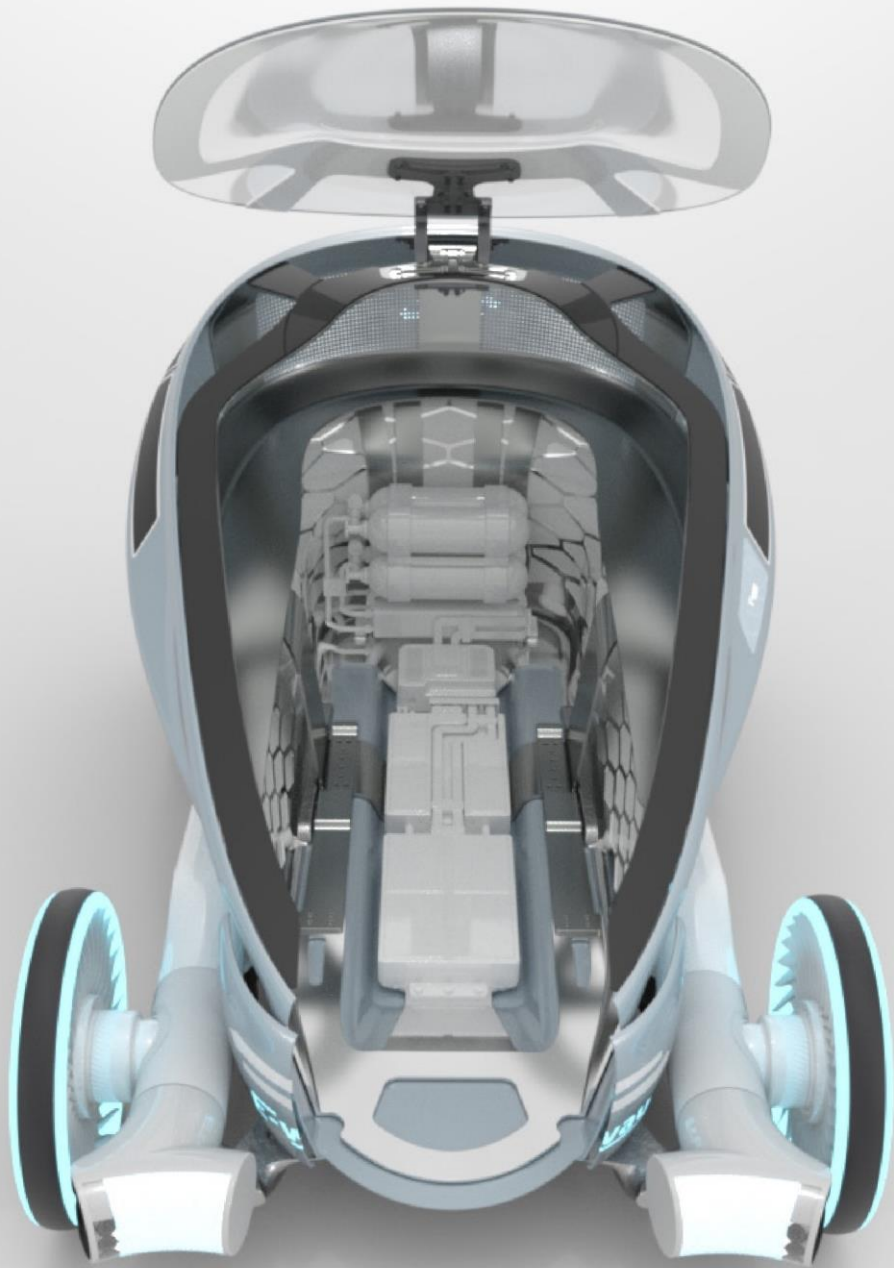
STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION



STEP 4

BUILD UP YOUR MODEL

The product development life cycle is anything but linear. At several points on your journey, critical pieces of feedback will cause you to **reassess and refine** your original design parameters. This is part of a healthy iterative process, as painful as it may feel.

Mechanical, electrical and physics simulations need to inform the design, and the design must respond to specific engineering challenges.

Seek out failures as early as possible. It is far easier to solve technical issues in a design model before such false securities underpin a near- finished product.



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INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

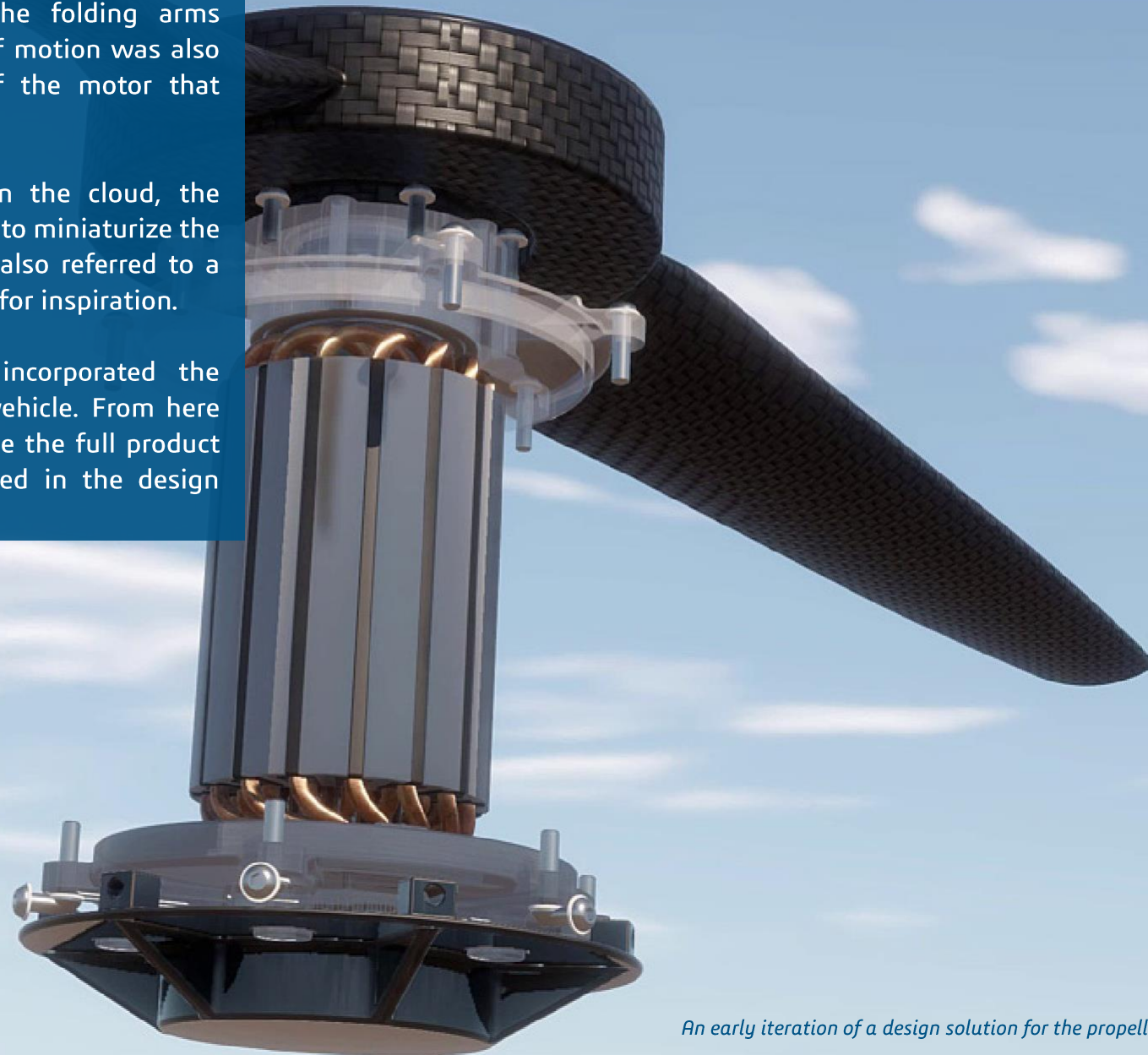
CONCLUSION

Idea-to-Reality Use Case (continued)

During an early validation cycle, the team working on the autonomous flying rescue vehicle discovered that the wheels hindered the extension of the folding arms supporting the propellers. Their range of motion was also limited by the size and placement of the motor that powered them.

Through the **3DEXPERIENCE** platform on the cloud, the mechanical engineer suggested a solution to miniaturize the motor without compromising power. He also referred to a certain drone with folding arms to look to for inspiration.

Together the designer and engineer incorporated the drone's folding design into the rescue vehicle. From here they were able to iterate quickly because the full product data and all parameters were embedded in the design model.



An early iteration of a design solution for the propeller

INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION



Integrated Modeling and Simulation (ModSim)

The opportunity to **design a product right the first time** is priceless. Finite resources put a limit on the number of physical prototypes that a team can produce for testing purposes.

But in a traditional product development process, sequential handoffs lock experiential knowledge in functional silos. The holistic design and impact of system integrations often aren't apparent until the physical prototype is in front of you.

Integrated ModSim delivers higher quality products faster, without extensive physical prototyping and testing. This approach mitigates the risk of surprises and reduces the need for rework.

An integrated ModSim approach also provides a multidimensional opportunity for collaboration between designers and analysts to run virtual simulations on the product model early in the design process. Collaborators experience the product more directly and the team's collective insights are maximized.

INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

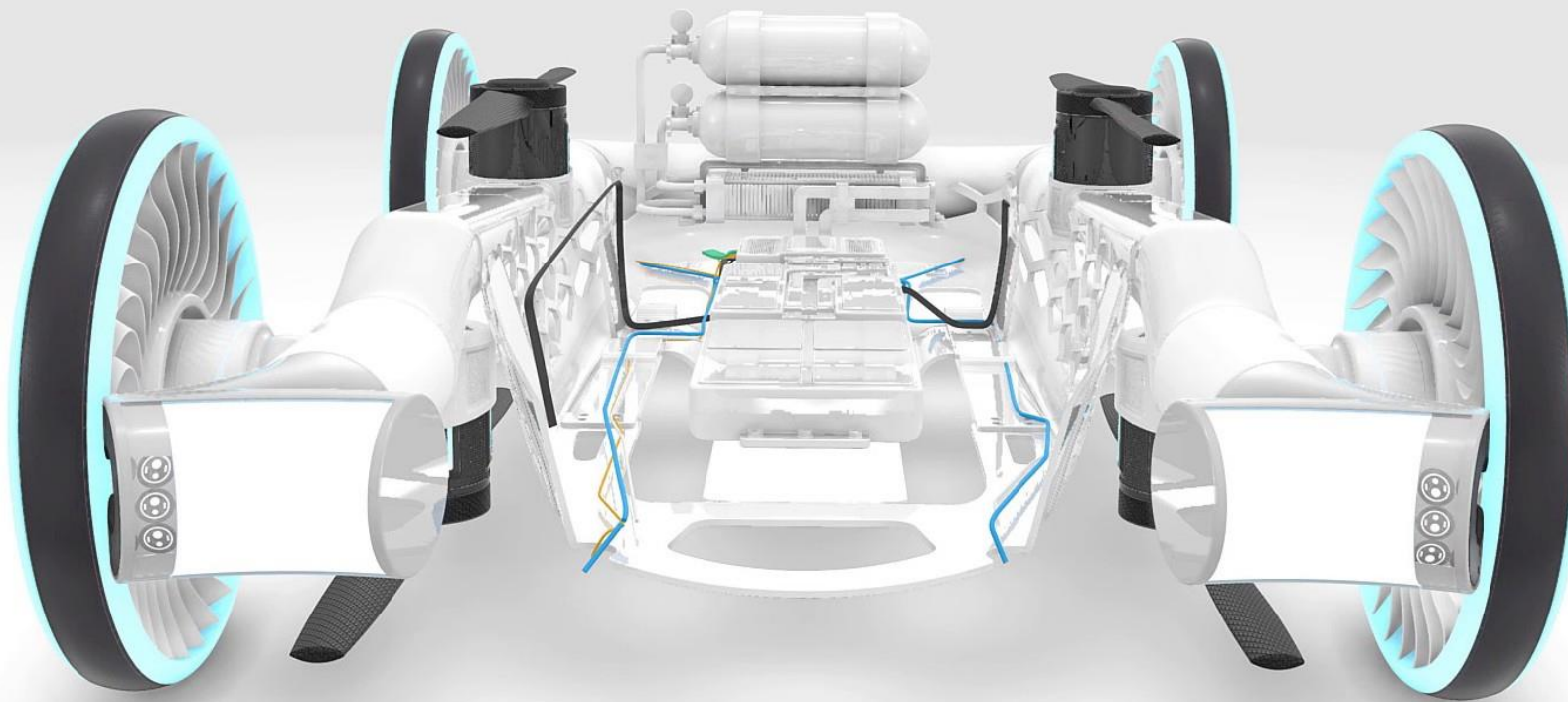
STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION



Integrated ModSim (continued)

System-specific applications such as Mold & Tooling Designer, Plastic Injection Engineer, Fluid Dynamics Engineer, Electrical 3D Systems Designer and more, are all integrated on the **3DEXPERIENCE** platform on the cloud.

These tools **predict subtle defects** in plastic parts and mold tooling, explore fluid flow and thermal performance, and evaluate complex wire harnesses, piping, tubing, and HVAC units.

As each system is optimized, the results are fed back into the design model's inputs, and a new model can be regenerated and simulated immediately.

INTRODUCTION

STEP 1:
HARNESS YOUR INSPIRATION

STEP 2:
REFINE YOUR CONCEPT

STEP 3:
MANAGE YOUR PROJECT

STEP 4:
BUILD UP YOUR MODEL

STEP 5:
INTEGRATE MANUFACTURING
PROCESSES

STEP 6:
SHARE YOUR CREATION
WITH THE WORLD

CONCLUSION

Idea-to-Reality Use Case (continued)

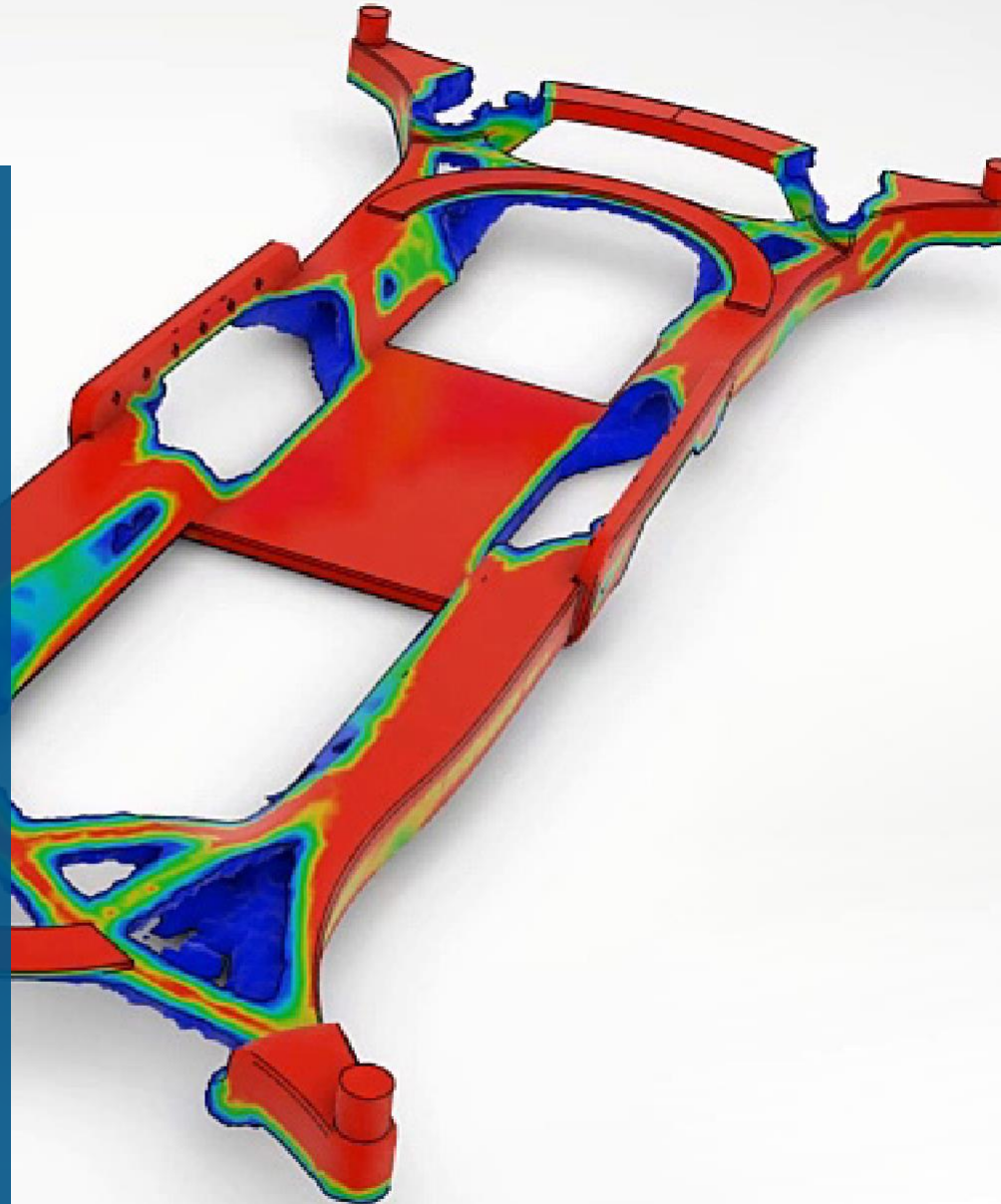
Simulation drove the design of the autonomous flying rescue vehicle. Early on, the team tested the structure of the seats and cabin using an integrated Modeling & Simulation process. By doing so, they uncovered the need for some critical changes:

WEIGHT

Using CATIA Function-Driven Generative Design, the team reduced the weight until they had just the right amount of material required to withstand structural charges. New parts were automatically generated from a functional specification, allowing the designer to compare and analyze multiple variations. A lighter system also meant less energy was required, so the specifications of the engine were modified accordingly.

AIRFLOW

For transporting patients in distress, the internal temperature and air circulation of the cabin are important factors and must be stable regardless of external conditions. A ModSim cycle simulating fluids and airflow within the cabin revealed the need to add ventilation grids on the back of the vehicle.



INTRODUCTION

STEP 1:
HARNESS YOUR INSPIRATION

STEP 2:
REFINE YOUR CONCEPT

STEP 3:
MANAGE YOUR PROJECT

STEP 4:
BUILD UP YOUR MODEL

STEP 5:
INTEGRATE MANUFACTURING
PROCESSES

STEP 6:
SHARE YOUR CREATION
WITH THE WORLD

CONCLUSION

STEP 5

INTEGRATE MANUFACTURING PROCESSES

It's time to connect the virtual world of modeling and simulation with the real world of operations. The full spectrum of stakeholders affecting the success of your product includes suppliers, manufacturers, logistics and transportation providers, service operators and workforce managers.

Design manufacturing sequences, plant layouts, logistics and assemblies with process simulation tools to optimize the total cost of production.

Digital continuity into this phase of product delivery enables maximum efficiency and flexibility, and establishes an integrated value stream. Any modification to the model ripples across all manufacturing processes and feedback from the factory floor can move upstream to inform design choices.

Virtual Twin Experience powered by the **3DEXPERIENCE** platform on the cloud produces an executable virtual model of a physical system which updates automatically from the results of real-world processes.



INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION



Explore one or more of those apps in **3DEXPERIENCE** for this step:



STEP 6

SHARE YOUR CREATION WITH THE WORLD

It's time to spread the word about your product vision that's coming to life, and collaborate with stakeholders on the launch. Before production begins, the marketing team can start bringing in value for product developers. The end-customer is an integral part of the product life-cycle. By listening to market insights, teams can react by shaping the product customers want.

3DEXCITE allows the marketing team to use the product design model and create diverse assets for digital, interactive, and personalized sales experiences. Essentially, the content goes-to-Market faster, builds excitement, and boosts sales. Consumer expectations have become a valuable currency in the experience economy, and it's time to push Marketing beyond just messaging. Prime these expectations and launch your product with success.

Now, what began as a far-fetched idea amid a lockdown has become a marketable product. The autonomous flying rescue vehicle was born in 6 months, thanks to the **3DEXPERIENCE** platform and a thoughtful collaboration team.



Explore one or more of those apps in **3DEXPERIENCE** for this step:

INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

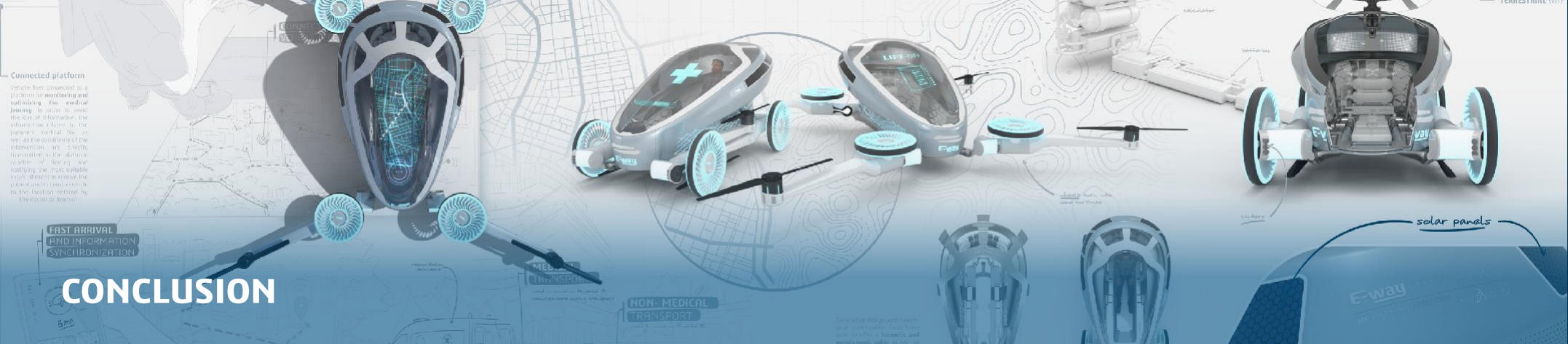
STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION



CONCLUSION

The idea-to-reality product development process happens quickly and reliably without IT constraints thanks to the 3DEXPERIENCE platform on the cloud.

This framework for managing collaboration and the flow of ideas throughout a project’s life cycle will keep your vision on track and **improve the end product** in the process. Indeed, it’s the unproven innovation that most needs a proven, robust product development process to get a fair shot at becoming a reality.

With all phases powered by the 3DEXPERIENCE platform on the cloud, product design teams iteratively improve on a vision by making data- driven decisions every step of the way. Powerful collaboration, design and simulation tools integrated through a scalable cloud-based system help you **flexibly and rapidly bring your wildest dreams to life**.

Step 1: Harness Your Inspiration	Step 2: Refine Your Concept	Step 3: Manage Your Project	Step 4: Build Up Your Model	Step 5: Integrate Manufacturing Processes	Step 6: Share Your Creation
Give shape to your idea and start it on the right track.	Use computational design and parametric tools to flesh out your idea.	Facilitate the flow of vital input from multi-disciplined contributors while protecting your IP.	Analyze performance virtually, iterate rapidly and optimize across all systems.	Connect directly to the factory floor and create an efficient production workflow.	Equip marketing partners with the details necessary to bring your idea to market.

INTRODUCTION

STEP 1: HARNESS YOUR INSPIRATION

STEP 2: REFINE YOUR CONCEPT

STEP 3: MANAGE YOUR PROJECT

STEP 4: BUILD UP YOUR MODEL

STEP 5: INTEGRATE MANUFACTURING PROCESSES

STEP 6: SHARE YOUR CREATION WITH THE WORLD

CONCLUSION

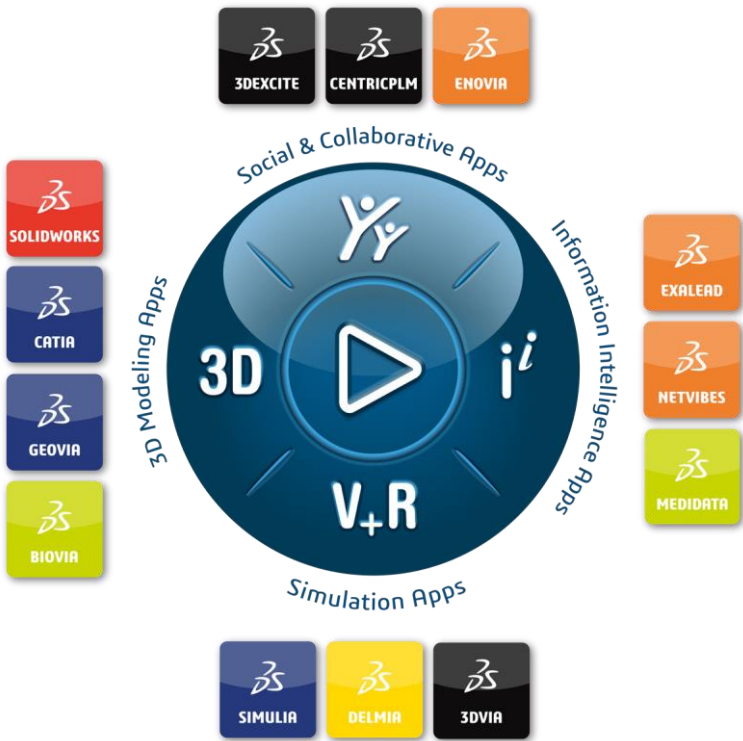
GET STARTED TODAY

The **3DEXPERIENCE** platform on the cloud is the foundation for collaborating more effectively, accelerating the concept-to-manufacturing timeline, and designing better products.

Discover how **3DEXPERIENCE** CATIA, SIMULIA, DELMIA, or ENOVIA can rapidly turn your vision into reality. Our comprehensive onboarding support team is ready to set you up for success.

Participate to your challenge with **3DEXPERIENCE** platform on the cloud!

Visit [Dassault Systèmes Student Competitions](#) (select *Other*, and name the challenge *Mobility for All*) to request an access, and login [here to 3DEXPERIENCE](#).



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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 experience twins’ of the real world with our 3DEXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production.

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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
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INTRODUCTION

STEP 1:
HARNESS YOUR INSPIRATION

STEP 2:
REFINE YOUR CONCEPT

STEP 3:
MANAGE YOUR PROJECT

STEP 4:
BUILD UP YOUR MODEL

STEP 5:
INTEGRATE MANUFACTURING PROCESSES

STEP 6:
SHARE YOUR CREATION WITH THE WORLD

CONCLUSION