



# 3DEXPERIENCE CATIA RELEASE HIGHLIGHTS-R2021X FD03

NEW ROLES PLUS OTHER ENHANCEMENTS TO IMPROVE YOUR DESIGN,  
ENGINEERING, SYSTEMS AND CONSTRUCTION PROCESSES



## Introduction

This new Dassault Systèmes' CATIA R2021x release FD03 delivers new Roles and enhancements for designers, engineers, systems engineers and construction professionals.

**For Designers**, 3D Shape Designer is a new role for nomad creative designers. It enables creativity anytime, anywhere on any device.

**For Engineers**, Multidiscipline Automated Drafter brings interactive drafting and rule-based automatic generation (including batch) of specialized drawings for heavy industries such as Marine & Offshore, Energy & Materials and Construction.

The new and unique Generative Functional Tolerancing functionality automates the creation of accurate geometric tolerancing schema for all engineers.

Flow Driven Generative Designer allows engineers who are not fluid analysis specialists to automatically generate optimal duct shapes based upon a functional specification.

The new Lattice Designer role enables the conceptual and detailed design of previously unachievable complex lattice structures for lightweight parts that are produced using additive manufacturing.

**For Systems Engineers**, In R2021x we continue to enhance our Cyber Systems Engineering capabilities, with new integrations with No Magic and STIMULUS, ensuring consistent and accurate solutions for Model based Systems Engineering across the enterprise.

**For Construction Professionals**, The new browser-based Computational Designer for Construction role brings generative and algorithmic modeling technology to designers and engineers. It enables these innovators to model complex shapes and patterns anywhere, any time on any device with no software to install.

## Multidiscipline Automated Drafter

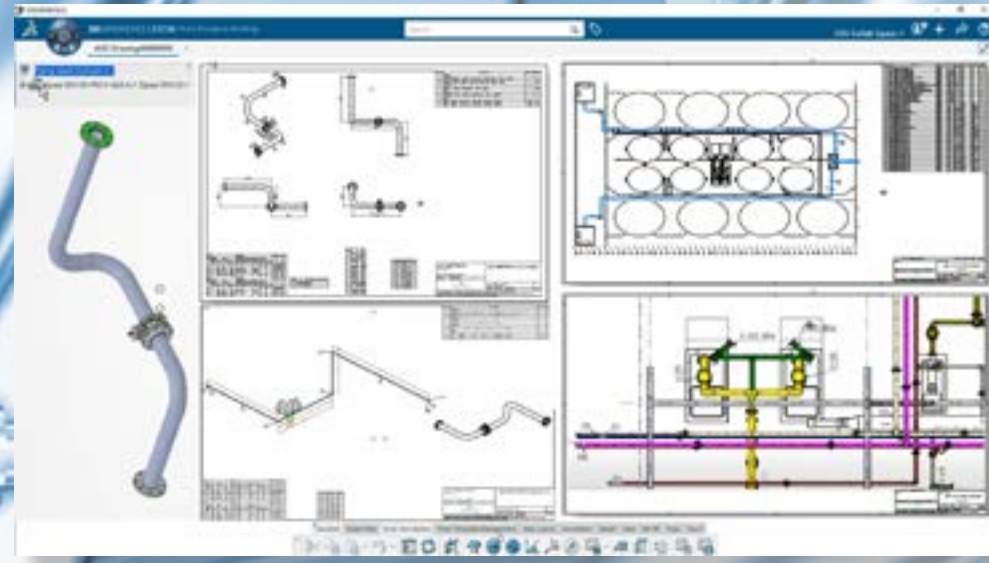
R2020x introduced rule-based automatic generation of specialized drawings for heavy industries such as Marine & Offshore, Energy & Materials and Construction.

R2021x extends this capability with a new role – Multidiscipline Automated Drafter, which meets the total drafting needs of these industries. The role contains all the general interactive and generative drafting capabilities of CATIA Drafting, augmented with industry specific automated functionality for heavy industries and construction. In addition, the role delivers a new automatic batch generation capability for Piping and HVAC orthogonal and isometric drawings.

Customers in these industries require the creation of 10,000's of specialized drawings and will benefit from a major increase in speed and accuracy with the smart automatic generation of industry-standard compliant drawings from, AND synchronized with, the master 3D model. In the shipbuilding industry, for example, engineers can interactively create a range of multi-view Frame Drawings for consecutive frames, complete with symbols and annotations, based on templates and rules. Once the first multi view drawing has been defined, it can be applied to any other 3D frames or assemblies to automatically generate the corresponding drawings.

Piping and HVAC orthogonal and isometric drawings for fabrication and installation can be easily (100s/1000s) batch generated automatically to a high quality level which respects industry and corporate standards. This role introduces a credit licensing model whereby administrators can make credits available to users of the role within the organization. Each time a batch is run, and the resulting model saved, credits are consumed according to the number of generated views.

Customers will dramatically reduce certification document production costs and improve quality.



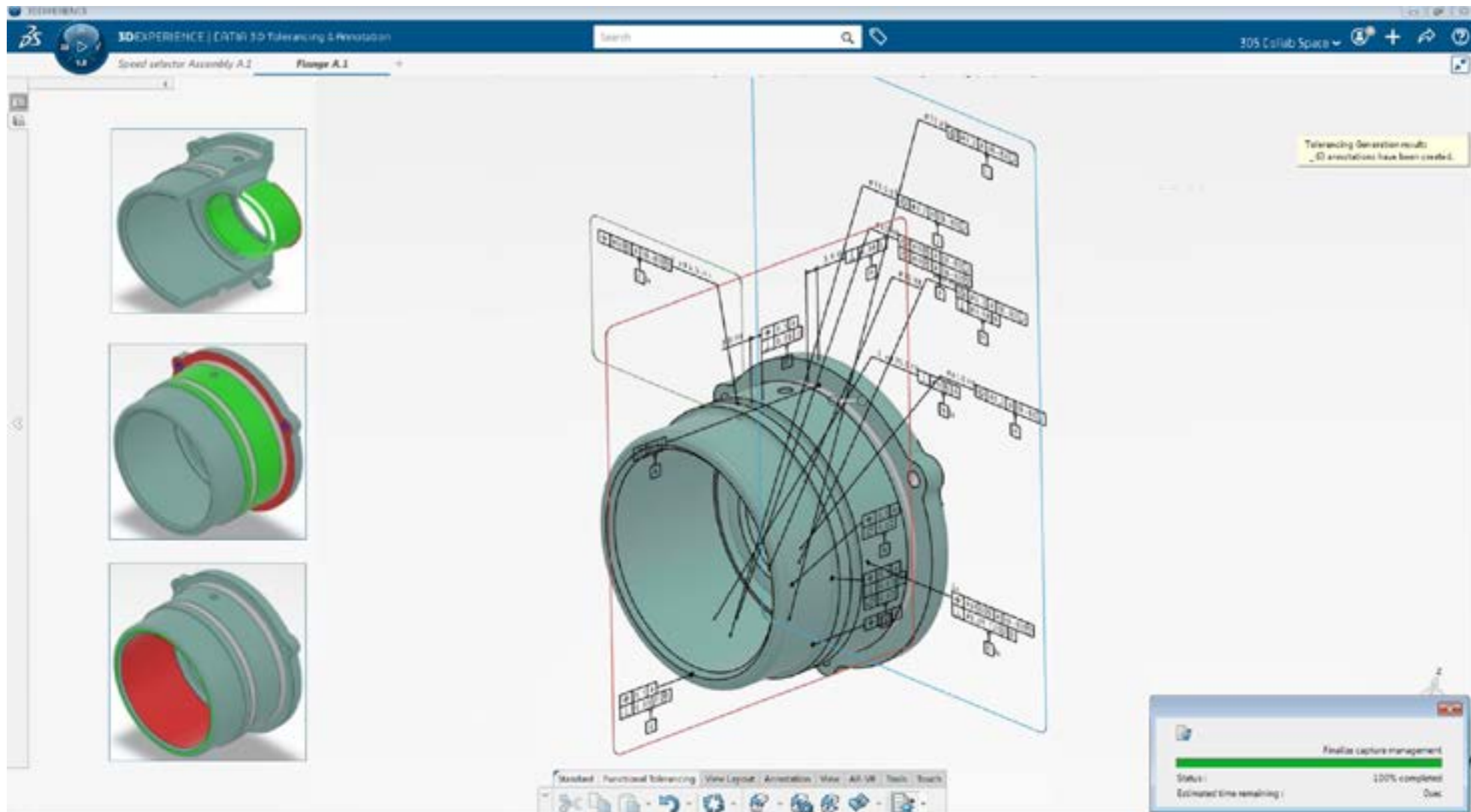


## Generative Functional Tolerancing

Geometric Tolerancing is required to fully define a product for manufacturing. To define these correctly takes time and requires expert tolerancing skills, experience and knowledge of internal and international standards. The new and unique Generative Functional Tolerancing functionality automates the process and brings the ability to quickly create accurate geometric tolerancing schema to all engineers. The geometric tolerances are generated automatically, based on the part's functional description (mechanical interfaces, mechanical junctions, functional surfaces)

Companies benefit from standardized and consistent tolerancing across their engineering function which reduces the risk of errors, delays and misinterpretations.

This functionality is automatically available to all roles which contain the CATIA 3D Tolerancing & Annotation application and is accessed using a credit licensing mechanism. Credits are consumed only when the model containing the created tolerances is saved to the 3DEXPERIENCE platform, which allows companies only to pay for the tolerances they generate. No additional credits are consumed when models are subsequently modified or re-used.



## Flow Driven Generative Designer

HVAC, cabin comfort and hydraulic systems engineers need to design complex networks of shapes which optimize internal fluid flow. They need to minimize pressure drops and recirculation while ensuring consistent maximum flow rates.

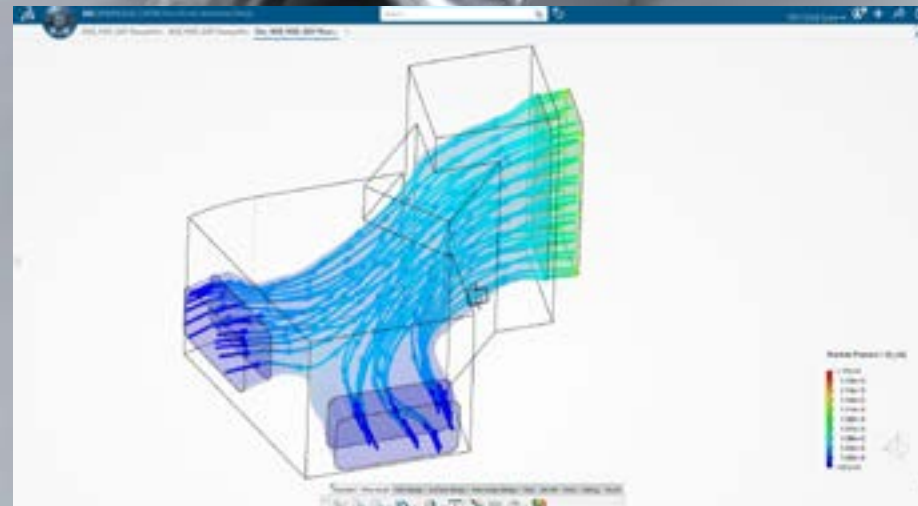
Today, this requires multi-discipline teams, using multiple non-integrated software solutions, to design, simulate, optimize and validate these complex products.

Flow Driven Generative Designer allows engineers who are not fluid analysis specialists to automatically generate optimal duct shapes based upon a functional specification.

The designer simply provides a set of requirements, including the 3D envelope and the portion of the flow to optimize, the actual fluid involved and the inlet and outlet conditions.

The push of a button runs a fluid dynamics simulation and generates the optimized duct that avoids recirculation of fluid and therefore reduces pressure drops. This results in fully-usable high-quality real surface geometry, within your engineering and manufacturing CAD environment. The geometry can be directly refined and shared on the 3DEXPERIENCE platform by all disciplines, from detailed design through analysis and manufacturing.

This integration of modeling and simulation ('MODSIM') brings scientific fluid simulation into the hands of the designer in the early design phase and enables seamless collaboration between design and simulation departments. Being able to experience product performance accurately reduces the need for costly prototypes and enables the confident delivery of better products faster.



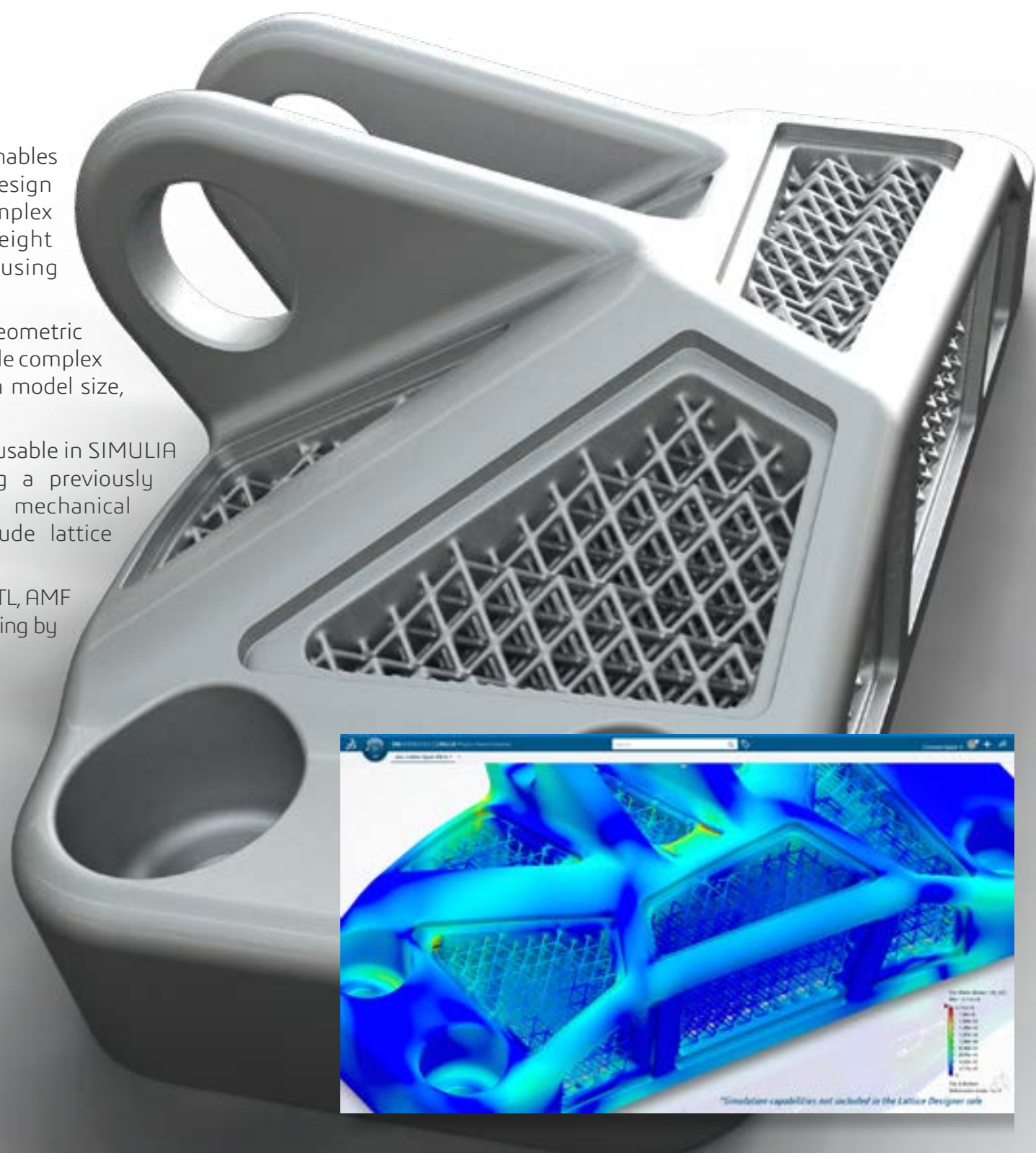
## Lattice Designer

The new Lattice Designer role enables the conceptual and detailed design of previously unachievable complex lattice structures for lightweight parts that are produced using additive manufacturing.

As part of the world-leading CATIA geometric modeler, it delivers robust and scalable complex lattice design without limitations on model size, visualization or number of cells.

The lattice data produced is directly usable in SIMULIA for structural validation, providing a previously unattainable confidence in the mechanical performance of designs that include lattice structures.

For production, it provides high quality STL, AMF or 3MF files for fast and reliable processing by 3D printers.





## Cyber Systems Engineering

In R2021x we continue to enhance our Cyber Systems Engineering capabilities, ensuring consistent and accurate solutions for Model based Systems Engineering across the enterprise.

This release enables users of the Systems Traceability Analyst and Systems Traceability Engineer roles to navigate, preview, trace and review the architecture models of systems, and systems of systems, including those created in the NoMagic CAMEO product, now available in the CATIA Magic Portfolio

A digital collaboration is achieved on all kinds of models (system, software, electrical, fluid...). Engineering disciplines can quickly understand the system specification coming from the Model Based Systems Engineering approach. System Engineers and Architects can, at any time, understand and check the design and implementation of the product. The availability of a holistic view of all models on the 3DEXPERIENCE platform, ensures consistency, accelerates the convergence between engineering disciplines and value networks, and reduces rework-loops, increasing design quality.

The CATIA Magic portfolio, following the acquisition of NoMagic by Dassault Systemes in 2018, enables model based systems engineering (MBSE) including:

- The most standard-compliant solution on the market (DoDAF 2.0, MODAF, NAF 4, UAF and UPDM standards) for Systems of Systems engineering as well as the definition of Enterprise Architectures.
- A SysML standard compliant solution for Systems Architecture. It enables running engineering analysis for design decisions evaluation and requirements verification, continuously checking model consistency and tracking design progress.
- A UML standard-compliant solution for defining software architectures.

All of these architectures can be simulated based on the fUML, SCXML, and other standards.

Requirements-in-the-loop simulation, delivered through the STIMULUS portfolio, allows the early identification of inconsistencies between requirements. Systems architects can simulate requirements to detect incorrect, missing or conflicting requirements before design begins. Later in the design cycle the validation engineer can simulate requirements to check that the system actually complies with its specification. In R2021x the requirements created in Stimulus can now be referenced in the Requirements Engineer role, bringing together all project requirements. For example, requirements can be written and simulated in Stimulus and, when validated, referenced in Requirements Manager. The result is a consistent and complete requirements view across the enterprise.

 **CATIA** | No Magic

**STIMULUS**  
Debug Your Requirements

## Computational Designer for Construction

R2021x further enriches the industry-focused 3DEXPERIENCE CATIA solutions for Architecture Engineering and Construction professionals, which addresses all participants in the end-to-end building process.

The new browser-based Computational Designer for Construction role brings generative and algorithmic modeling technology to designers and engineers. It enables these innovators to model complex shapes and patterns anywhere, any time on any device with no software to install.

The CATIA xGenerative Design application is an on-the-cloud generative modelling environment that uniquely combines graphical visual scripting and interactive 3D modeling, with the ability to use one or the other interchangeably at any time. This intuitive and smart approach allows architectural designers to quickly design, explore and validate variations of complex, repetitive and non-regular shapes and patterns.

Also available as a web application, the CATIA xShape application allows users to create organic and freeform surfaces using advanced wireframe & subdivision surface modeling technology. (This is built on the CATIA Imagine and Shape subdivision surfacing technology.)

All created geometry is available to be used in the world of detailed design and manufacture through the rich portfolio of roles on the 3DEXPERIENCE platform and can be geolocated. The models created are compliant with the Industry Foundation Class (IFC) data model. A full set of data converters is available for the import and export to and from other systems.





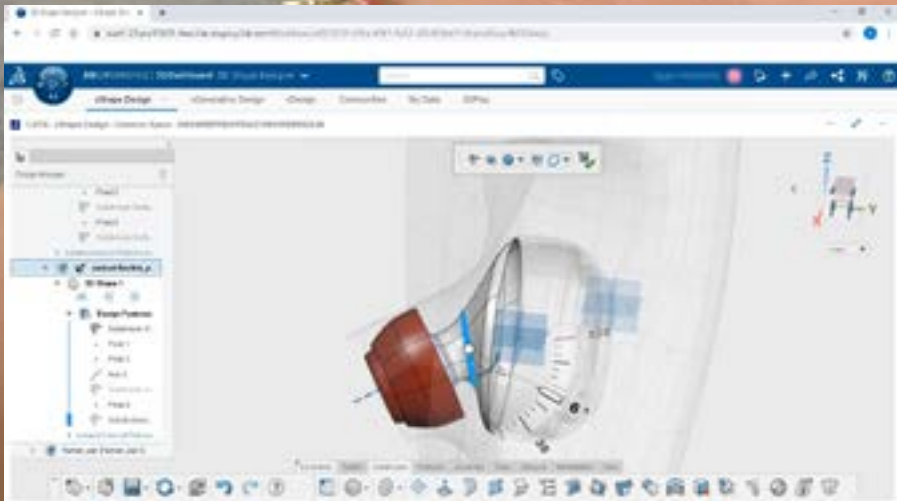
## 3D Shape Designer

CATIA 3D Shape Designer is a new role introduced in 3DEXPERIENCE R2021x for nomad creative designers. It enables creativity anytime, anywhere on any device with web browser applications for 3D design, freeform shape sculpting and pattern design. The product is exclusively available on the cloud, allowing teams to get up and running quickly, and seamlessly connecting studios or small agencies with their eco-systems.

3D Shape Designer allows designers to quickly create and explore organic shapes with a digital clay modeling approach based on subdivision surface technology with the CATIA xShape Design application.

3D patterns can be quickly generated for styling exploration with the CATIA xGenerative Design application.

Users experience a consistent 3D innovative modeling workflow with a unique integration of feature based solid modeling and assembly capabilities with the CATIA xDesign application.



**Our 3DEXPERIENCE® platform powers our brand applications, serving 11 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 experience twins' 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 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit [www.3ds.com](http://www.3ds.com).

