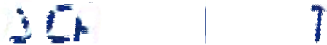


CATIA



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CATIA



| | |
|---|--|
| Developer(s) | Dassault Systèmes |
| Initial release | 1977; 43 years ago |
| Stable release | P3 V5-6 R2017 SP6.0 / 2018; 2 years ago |
| Operating system | Windows , Unix (server) |
| Type | CAD , CAM , CAE , PLM , 3D |
| License | Proprietary software |
| Website | www.3ds.com/products-services/catia/ |

CATIA software(/kəˈtiːə/, an [acronym](#) of **computer-aided three-dimensional interactive application**) is a multi-platform [software suite](#) for [computer-aided design](#) (CAD), [computer-aided manufacturing](#) (CAM), [computer-aided engineering](#) (CAE), [PLM](#) and [3D](#), developed by the French company [Dassault Systèmes](#).



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History

CATIA started as an in-house development in 1977 by French aircraft manufacturer [AVIONS MARCEL DASSAULT](#), at that time customer of the [CADAM](#) software^[1] to develop Dassault's [Mirage](#) fighter jet. It was later adopted by the aerospace, automotive, shipbuilding, and other industries.

Initially named CATI (*conception assistée tridimensionnelle interactive* – French for *interactive aided three-dimensional design*), it was renamed CATIA in 1981 when Dassault created a subsidiary to develop and sell the software and signed a non-exclusive distribution agreement with [IBM](#).^[2]

In 1984, the [Boeing](#) Company chose CATIA V2 as its main 3D CAD tool, becoming its largest customer.

In 1988, CATIA V3 was ported from [mainframe computers](#) to [Unix](#).

In 1990, [General Dynamics Electric Boat](#) Corp chose CATIA as its main 3D CAD tool to design the U.S. Navy's [Virginia class submarine](#)^{[3][4][5]}. Also, Lockheed was selling its CADAM system worldwide through the channel of IBM since 1978.

In 1992, CADAM was purchased from [IBM](#), and the next year CATIA CADAM V4 was published.

In 1996, it was ported from one to four Unix operating systems, including IBM [AIX](#), Silicon Graphics [IRIX](#), Sun Microsystems [SunOS](#), and Hewlett-Packard [HP-UX](#).

In 1998, V5 was released and was an entirely rewritten version of CATIA with support for UNIX, [Windows NT](#) and [Windows XP](#) (since 2001).^[6]

In the years prior to 2000, problems caused by incompatibility between versions of CATIA (Version 4 and Version 5) led to \$6.1B in additional costs due to years of project delays in production of the Airbus A380.^[7]

In 2008, Dassault Systèmes released CATIA V6.^[8] While the server can run on [Microsoft Windows](#), [Linux](#) or AIX, client support for any operating system other than Microsoft Windows was dropped.^[9]

In November 2010, Dassault Systèmes launched CATIA V6R2011x, the latest release of its PLM2.0 platform, while continuing to support and improve its CATIA V5 software.

In June 2011, Dassault Systèmes launched V6 R2012.

In 2012, Dassault Systèmes launched V6 2013x.

In 2014, Dassault Systèmes launched 3DEXPERIENCE Platform R2014x^[10] and CATIA on the Cloud, a cloud version of its software.^{[11][12]}

In 2018, [Dassault Systèmes](#) launched 3DEXperience Marketplaces to connect CATIA Users, with manufacturers, standard parts creators and engineers.^[13]

In 2019, 3DEXperience Marketplaces launched an Add-in in Catia, to connect directly manufacturers with designers.^[14]

Release history

| Name/Version | History Value | Release Date |
|--------------|---------------|---------------------------|
| Catia v1 | | 1981 ^[6] |
| Catia v2 | | 1984 ^[6] |
| Catia v3 | | 1988 ^[6] |
| Catia v4 | | 1993 ^[6] |
| Catia v5 | | 1998 ^[6] |
| Catia v5 | R7 | 26/6/2001 ^[15] |
| Catia v5 | R17 | 5/9/2006 ^[16] |
| Catia v5 | R18 | 10/2/2007 |
| Catia v5 | R19 | 23/8/2008 ^[17] |
| Catia v6 | R2010 | 23/6/2009 ^[18] |
| Catia v5 | R20 | 16/2/2010 ^[19] |
| Catia v5 | R21 | 5/7/2011 ^[20] |
| Catia v6 | R__ | _/_/2011 |
| Catia v5-6 | R2012 (R22) | 18/4/2012 ^[21] |
| Catia v6 | R20 | 20/5/2013 |
| Catia v5-6 | R2013 (R23) | 2013 ^[22] |
| Catia v5-6 | R2014 (R24) | 2014 ^[23] |
| Catia v5-6 | R2015 (R25) | 2015 ^[24] |

| | | |
|------------|-------------|----------------------|
| Catia v5-6 | R2016 (R26) | 2016 ^[25] |
| Catia v5-6 | R2017 (R27) | 2017 ^[26] |
| Catia v5-6 | R2018 (R28) | 2018 ^[27] |
| Catia v5-6 | R2019 (R29) | 2019 |

Scope of application

Commonly referred to as a [3D Product Lifecycle Management](#) software suite, CATIA supports multiple stages of product development ([CAx](#)), including conceptualization, design ([CAD](#)), engineering ([CAE](#)) and manufacturing ([CAM](#)). CATIA facilitates collaborative engineering across disciplines around its 3DEXPERIENCE platform, including surfacing & shape design, electrical, fluid and electronic systems design, [mechanical engineering](#) and [systems engineering](#).

CATIA facilitates the design of electronic, electrical, and distributed systems such as fluid and [HVAC](#) systems, all the way to the production of documentation for manufacturing.

Mechanical engineering

CATIA enables the creation of 3D parts, from 2D sketches, [sheetmetal](#), [composites](#), molded, forged or tooling parts up to the definition of mechanical assemblies. The software provides advanced technologies for mechanical surfacing & [BIW](#). It provides tools to complete product definition, including functional tolerances as well as [kinematics](#) definition. CATIA provides a wide range of applications for tooling design, for both generic [tooling](#) and mold & die. In the case of Aerospace engineering an additional module named the aerospace sheetmetal design offers the user combine the capabilities of generative sheetmetal design and generative surface design.^[28]

Design

CATIA offers a solution^[buzzword] to shape design, styling, surfacing workflow and visualization to create, modify,^[29] and validate complex innovative shapes from industrial design to [Class-A surfacing](#) with the ICEM surfacing technologies. CATIA supports multiple stages of product design whether started from scratch or from 2D sketches(blueprints).^[28]

Systems engineering

The CATIA Systems Engineering solution^[buzzword] delivers a unique open and extensible systems engineering development platform that fully integrates the cross-discipline modeling, simulation, verification and business process support needed for developing complex ‘cyber-physical’ products. It enables organizations to evaluate requests for changes or develop new products or system variants utilizing a unified performance based systems engineering approach. The solution^[buzzword] addresses the Model Based Systems Engineering (MBSE) needs of users developing today’s smart products and systems and comprises the following elements: [Requirements Engineering](#), [Systems Architecture](#) Modeling, Systems Behavior Modeling & Simulation, Configuration Management & Lifecycle Traceability, Automotive Embedded

Systems Development (AUTOSAR Builder) and Industrial [Automation](#) Systems Development (ControlBuild).

CATIA uses the open [Modelica](#) language in both CATIA Dynamic Behavior Modeling and [Dymola](#), to quickly and easily model and simulate the behavior of complex systems that span multiple engineering discipline. CATIA & [Dymola](#) are further extended by through the availability of a number of industry and domain specific [Modelica](#) libraries that enable user to model and simulate a wide range of complex systems – ranging from automotive vehicle dynamics through to aircraft flight dynamics.^[30]

Electrical systems

CATIA v5 offers a solution^[buzzword] to formulate the design and manufacturing of electrical systems spanning the complete process from conceptual design through to manufacturing. Capabilities include requirements capture, electrical schematic definition, interactive 3D routing of both wire harnesses and industrial cable solutions through to the production of detailed manufacturing documents including form boards.^[31]

Fluid systems

CATIA v5 offers a solution^[buzzword] to facilitate the design and manufacturing of routed systems including tubing, piping, Heating, Ventilating & Air Conditioning ([HVAC](#)). Capabilities include requirements capture, 2D diagrams for defining hydraulic, pneumatic and [HVAC](#) systems, as well as [Piping and Instrumentation Diagram](#) (P&ID). Powerful capabilities are provided that enables these 2D diagrams to be used to drive the interactive 3D routing and placing of system components, in the context of the digital mockup of the complete product or process plant, through to the delivery of manufacturing information including reports and piping isometric drawings.^[32]

Industries

CATIA can be applied to a wide variety of industries, from aerospace and defense, automotive, and industrial equipment, to high tech, shipbuilding, consumer goods, plant design, consumer packaged goods, life sciences, architecture and construction, process power and petroleum, and services. CATIA V4, CATIA V5, [NX](#) (formerly Unigraphics), and Dassault Systèmes' own [SolidWorks](#) platform are the dominant systems^[citation needed].

Aerospace

[The Boeing Company](#) used CATIA V3 to develop its [777](#) airliner and used CATIA V5 for the [787](#) series aircraft. They have employed the full range of Dassault Systèmes' 3D PLM products – CATIA, [DELMIA](#), and [ENOVIA LCA](#) – supplemented by Boeing-developed applications.^[33]

The development of the Indian Light Combat Aircraft has used CATIA V5.

Chinese [Xian JH-7A](#) was the first aircraft developed by CATIA V5 when the design was completed on 26 September 2000.

European aerospace [Airbus](#) is also using CATIA.^[34]

Canadian aircraft maker [Bombardier Aerospace](#) has done all of its aircraft design on CATIA V5.^[35]

[BAE Systems](#) uses CATIA.^[36]

The Brazilian aircraft company [Embraer](#) uses CATIA V4 and V5 to build all airplanes.

[FNSS](#) is using CATIA V5 and V6.^[37]

[Vought](#) Aircraft Industries uses CATIA V4 and V5 to produce its parts.

The Anglo/Italian Helicopter company [AgustaWestland](#) uses CATIA V4 and V5 to design their full range of aircraft.

All subsidiaries of the French company [Safran](#) use CATIA for a full range of aerospace, defence and security products.

The [Eurofighter Typhoon](#) has been designed using both CATIA V4 and V5.

The main supplier of helicopters to the U.S Military forces, Sikorsky Aircraft Corp., uses CATIA as well.

P3 Voith is using CATIA V6 electrical.^[38]

[Bell Helicopter](#), the creator of the [Bell Boeing V-22 Osprey](#), has used CATIA V4, V5 and V6.^[39]

Of course, [Dassault Aviation](#) is also using CATIA and they are currently working on CATIA V6.^[40]

Automotive

Many automotive companies use CATIA to varying degrees, including [BMW](#), [Porsche](#), [McLaren Automotive](#),^[41] [Chrysler](#), [Honda](#),^[42] [Audi](#),^[43] [Jaguar Land Rover](#), [Volkswagen](#), [SEAT](#), [Škoda](#), [Bentley Motors Limited](#), [Volvo](#), [Fiat](#), [Benteler International](#), [PSA Peugeot Citroën](#),^[44] [Renault](#),^[45] [Toyota](#),^[46] [Ford](#), [Scania](#), [Hyundai](#), [Tesla Motors](#),^[47] [Rolls-Royce Motors](#), [Valmet Automotive](#), [Proton](#), Elba, [Tata motors](#)^[48] and [Mahindra & Mahindra Limited](#). [Goodyear](#) uses it in making tires for automotive and aerospace and also uses a customized CATIA for its design and development. Many automotive companies use CATIA for car structures – door beams, IP supports, bumper beams, roof rails, side rails, body components because of CATIA's capabilities in [Computer representation of surfaces](#). [Bombardier Transportation](#) of Canada is using this

software to design its entire fleet of Train engines and coaches. [Webasto](#) uses CATIA to design its roof.^[49]

Shipbuilding

Dassault Systèmes has begun serving shipbuilders with CATIA V5 release 8, which includes special features useful to shipbuilders. [GD Electric Boat](#) used CATIA to design the latest fast attack submarine class for the [United States Navy](#), the [Virginia class](#).^[50] [Newport News Shipbuilding](#) also used CATIA to design the [Gerald R. Ford class](#) of [supercarriers](#) for the US Navy.^[51] In 2004, it has been adopted by the [Beneteau](#) Group for development of new sailing and leisure motor boats.^[52]

Industrial equipment

CATIA has a strong presence in the Industrial Equipment industry. [Industrial Manufacturing machinery](#) companies like Schuler and [Metso](#) use CATIA, as do heavy mobile machinery and equipment companies like [Claas](#), and also various industrial equipment product companies like [Alstom Power](#) and [ABB Group](#). [Michelin](#) is also using CATIA for its production.^[53]

High tech

Some high tech companies are using CATIA to design their products. You can find for example: [Nikon](#),^[54] [Nokia](#),^[55] [Pegatron](#).^[56]

Energy, process and utilities

[Suzlon](#) uses CATIA to manufacture turbine blades.^[57]

[Gamesa](#) uses CATIA to design and manufacture wind turbines.

Consumer packaged goods (CPG) and retail

[Procter & Gamble](#) (P&G) is using CATIA to optimize its packagings.^[58]



Example of modeling in CATIA

Architecture

Architect [Frank Gehry](#) has used the software through the C-Cubed Virtual Architecture company, now Virtual Build Team, to design [curvilinear](#) buildings.^[59] His technology arm, [Gehry Technologies](#), has been developing software based on CATIA V5 named [Digital Project](#).^[60] Digital Project competes for market share with Graphisoft's ARCHICAD, [Revit](#), [AECOSim Building Designer](#) and other [Building Information Modelling](#) applications. [SHoP Architects](#) company is using CATIA for its designs.^[61] Latest AEC company to use CATIA 3DEXPERIENCE on the Cloud [1], is [Zaha Hadid Architects](#) who also won the **2017 Award for Innovation in Collaboration** awarded by the **Construction Computing journal** for the collaboration on the **Danjiang Bridge Project** ([case study](#)) in Taiwan.

File compatibility and CATIA V4 /V5 /V6 conversion

Dassault Systèmes provides utilities to convert CATIA V4 data files so they are accessible to CATIA V5 and CATIA V6. Still, cases show that there can be issues in the data conversion from CATIA V4 to V5 from either differences in the geometric kernel between CATIA V4 and CATIA V5 or by the modelling methods employed by end users. The percentage loss can be minimized by using the appropriate pre-conversion clean-up, choosing the appropriate conversion options, and clean-up activities after conversion.

Conversion from CATIA Version 4 to Version 5 created construction problems for the Airbus A380 aircraft. These problems resulted in \$6.1B of additional costs due to years of project delays when aircraft wiring was too short to make connections.

Transition from V5 to V6 is facilitated because they are sharing the same geometric kernel. Third-party file translators also up-convert CATIA files between versions.