

Machining solutions



CATIA V5

As one of the software applications that lies at the heart of the PLM solution set, CATIA Version 5 is the cornerstone of true integration between people, tools, methodologies and resources within an enterprise. Its unique product, process, resource model and workplace approach provide a fully collaborative environment that fosters creativity, knowledge sharing and the communication of three-dimensional (3D) product and process-centric definitions.

The ability to capture and reuse knowledge embedded within CATIA facilitates the implementation of corporate design best practices. It also frees end-users to concentrate on enhanced creativity and innovation.

In addition, the open CATIA V5 application architecture allows a vast and growing number of third-party vendors to submit specialised applications to meet targeted needs.



Machining solutions

With the completeness of the CATIA product portfolio and the easy-to-use knowledge-based CATIA V5 architecture, CATIA V5 machining solutions exceed the capabilities of all existing machining applications.

Some of the highlights include:

- **High efficiency in part programming** – Thanks to tight integration between tool path definition and computation, tool path verification and output creation the user can boost production quality by machining the right part, first time. Machining operations, supporting multiple passes and levels and automated rework in roughing and finishing ensure a high level of productivity.
- **Effective change management** – This solution set possesses a high level of associativity between product engineering and manufacturing processes and resources (PPR). Companies can therefore manage concurrent engineering and manufacturing flows better and reduce the design-to-manufacturing cycle time and then saving costs.
- **High level of automation and standardisation** – By integrating the pervasive knowledgeware capabilities of CATIA V5, machining products allow the capture of skills and reuse of proven manufacturing knowledge and avoids repetition. This also facilitates innovation through shortened test cycles.
- **Optimised tool paths and reduced machining time** – CATIA V5 machining products offer a wide set of flexible high-speed machining operations. This decreases the time needed to execute shop floor operations, such as concentric roughing, Z-level milling, spiral milling and 5-axis flank contouring.
- **Easy to learn and easy-to-use solutions** – As a result of an intuitive user interface, users are trained faster and then use the full breadth of CATIA V5.
- **Reduced administration costs and skills efforts** – CATIA V5 machining solutions can be used as a single system to cover a wide set of integrated applications, such as lathe to 5-axis milling. This allows companies to institute strong, manageable and long-term partnerships with their CATIA CAM supplier.

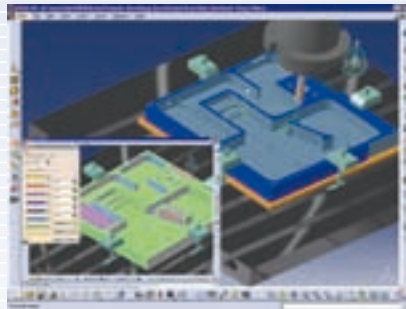
Configurations



CATIA – Designer and Advanced Machinist 2 Configuration (AM2)



CATIA – Mold and Die Machinist 2 (MO2)



CATIA – Prismatic Machinist 2 (PM2)

CATIA – Designer and Advanced Machinist 2 Configuration (AM2)

Enables aerospace companies to efficiently manage the structural parts design-to-manufacturing process. AM2 delivers, within the single CATIA V5 environment, powerful mechanical and surfacic design tools as well as advanced 2.5 to 5 axis program definition tools to manufacture high quality complex parts. What makes AM2 unique is the integrated material removal simulation capability with advanced part analysis in that single CATIA V5 environment. AM2 is thus the ideal solution to free aerospace companies (from OEMs to co- and sub-contractors) from an heterogeneous environment. These companies can therefore better than ever manage design changes and enrich their concurrent engineering and manufacturing methodologies.

CATIA – Mold and Die Machinist 2 (MO2)

Delivers all the necessary tools for shop floor manufacturers involved in mold and die program definitions. As a CATIA P2 configuration, MO2 offers integration tools that are compatible with CATIA V4. It also includes data interfaces to the most frequently used industry standards.

CATIA – Prismatic Machinist 2 (PM2)

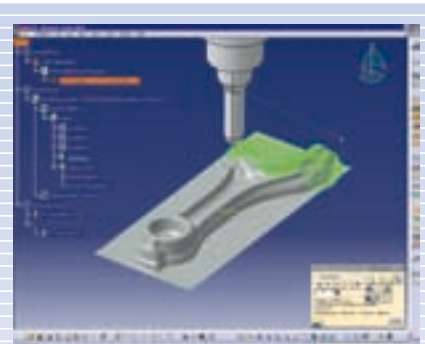
Delivers all the necessary tools for shop floor manufacturers involved in 2.5-axis program definition. As a CATIA P2 configuration, PM2 offers integration tools that are compatible with CATIA V4. It also includes data interfaces to the most frequently used industry standards.

CATIA – Preparation Machinist 2 (RM2)

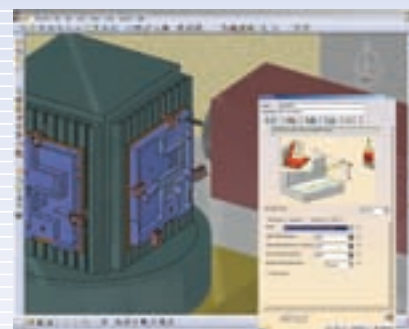
Integrates the powerful standard 3D and 2D mechanical design tools with generative programming tools for 2.5 axis and 3-axis surface machining NC manufacturing tools. It is targeted at NC manufacturing users who need to make design modifications or create additional geometries, fixtures or even drawings to explain the machine set-up. The easy implementation and propagation of modifications are only possible through the associativity of CATIA V5.

CATIA – Preparation Prismatic Machinist 2 Configuration (RP2)

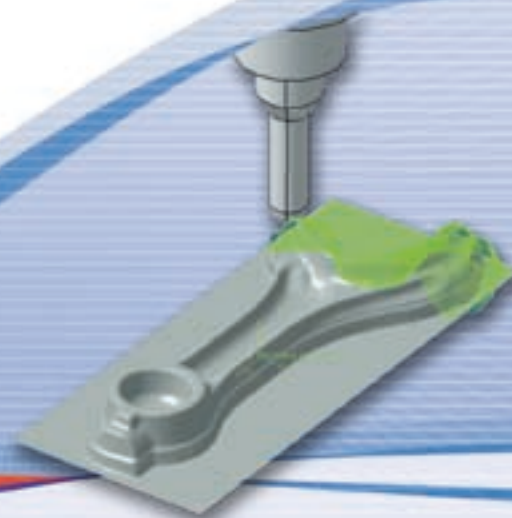
Integrates the powerful standard 3D and 2D mechanical design tools with generative 2.5-axis machining tools. It is targeted at tooling and jigs and fixtures maker companies who need to make design modifications or create additional geometries, features or even drawings before machining the created products. Whatever the original design of these products, the RP2 user can rapidly create knowledge based NC manufacturing programs thanks to the machining feature recognition tools. This allows for instance to automate the drilling operation creation with an unequalled quickness. The easy implementation and propagation of design modifications are boosted through the associativity of CATIA V5.



CATIA – Preparation Machinist 2 (RM2)



CATIA – Preparation Prismatic Machinist 2 Configuration (RP2)



Products

CATIA – Lathe Machining 1 (LG1)

Easily defines 2-axis turning and drilling operations, for both horizontal and vertical lathe machines. Quick tool path definition is ensured thanks to an intuitive user interface based on graphic dialogue boxes. Tools can easily be created and stored in tool catalogues. Entire manufacturing process is covered from tool path definition, computation and verification to NC code and shop floor documentation generation. Associativity with CATIA design parts allows efficient change management.

CATIA – NC Manufacturing Review 1 (NG1)

Offers basic NC capabilities such as tool path verification and creation of shopfloor documentation. It provides the infrastructure for all V5 P1 NC programming products and allows NC programmers or machine operators to browse and review V5 part operations. Furthermore, different manufacturing data such as APT files, CL files and ISO code can be imported and reviewed.

CATIA – Prismatic Machining 1 (PG1)

Easily defines drilling and 2.5-axis milling operations. Quick tool path definition is ensured thanks to an intuitive user interface based on graphic dialogue boxes. Tools can be easily created and stored in tool catalogues. Entire manufacturing process is covered from tool path definition, computation and verification to NC code and shop floor documentation generation. Associativity with CATIA design parts allows efficient change management.

CATIA – STL Rapid Prototyping 1 (TL1)

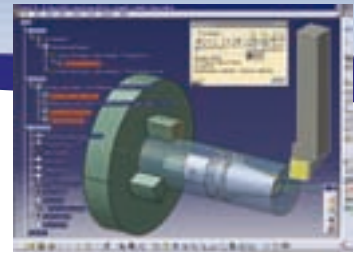
Creates STL files in a fast and accurate way by tessellation of CAD data. It allows the import of existing STL files, the display of meshes and the analysis of their quality. The product offers basic tools to improve the quality of meshes by removing and reorganising triangles. In addition, it allows the creation of thin offsets to obtain a watertight solid. The meshes can be exported as a standard binary STL file for rapid prototyping machines.

CATIA – Advanced Machining 2 (AMG)

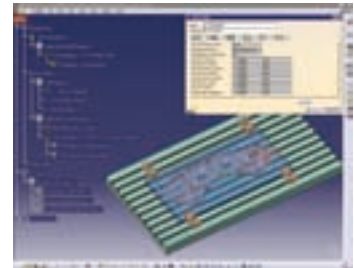
Easily defines NC programs to machine complex 3D parts (for example, for aerospace, hydraulics, and turbo machinery) within a single workbench. The product offers machining operations covering milling from 2.5-axis mode up to 5-axis mode as well as axial machining. In addition to the complete set of machining operations offered by other V5 machining products like CATIA – Prismatic Machining 2 (PMG), CATIA – 3-Axis Surface Machining 2 (SMG) and CATIA – Multi-Axis Machining 2 (MMG); CATIA – Advanced Part Machining 2 introduces multi-axis flank contouring, 5-axis helix machining for turbo-machinery parts, and advanced multi-axis processes like the unmatched multi-pocket strategies dedicated to structural part machining.

CATIA – Lathe Machining 2 (LMG)

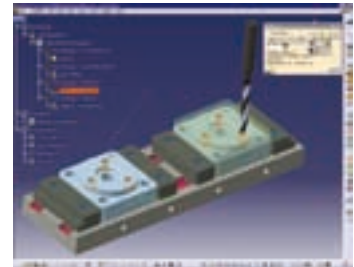
Easily defines 2-axis turning and drilling operations, for both horizontal and vertical lathe machines. Quick tool path definition is ensured thanks to an intuitive user interface based on graphic dialogue boxes. Tools can be easily created and stored in tool catalogues. Entire manufacturing process is covered from tool path definition and computation, tool path verification including material removal simulation to NC code and shop floor documentation generation. Associativity with CATIA design parts allows efficient change management.



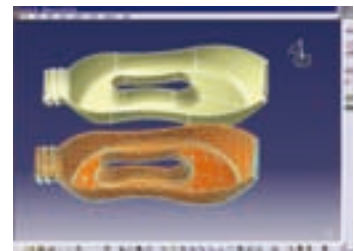
CATIA – Lathe Machining 1 (LG1)



CATIA – NC Manufacturing Review 1 (NG1)



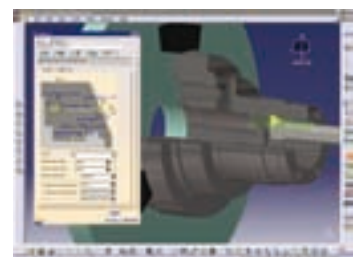
CATIA – Prismatic Machining 1 (PG1)



CATIA – STL Rapid Prototyping 1 (TL1)



CATIA – Advanced Machining 2 (AMG)



CATIA – Lathe Machining 2 (LMG)

Products

CATIA – NC Machine Tool Builder 2 (MBG)

NC Machine Tool Builder easily models resources, such as NC machines, tools, tool changers, pallet changers, and other peripheral devices for use and reuse in the entire machining process. NC Machine Tool Builder provides a comprehensive NC machine definition including geometry, kinematics, controller and technological information. Resources created with NC Machine Tool Builder may be saved to the DELMIA Manufacturing hub and used by process planners, NC programmers and operators to create machining process plans, validate machining setups, detail machining operations, validate and optimise tool paths, perform post processing, and emulate controllers. NC Machine Tool Builder can also import NC machines created in DELMIA D5 Virtual NC for use in V5 machining application.

CATIA – Multi-Slide Lathe Machining 2 (MLG)

Enables NC programmers to leverage the productivity of multi-slide lathe machining centres with multiple turrets and spindles. These types of multi-turret and multi-spindle machines deliver significant productivity gains to manufacturing companies as soon as they are managed by an adaptive solution for the off-line programming and simulation. CATIA – Multi-Slide Lathe Machining 2 (MLG) delivers to the shopfloor programmer powerful tools for easily creating, simulating and synchronising NC programs using multiple turrets. Its objective is to shorten the time needed to machine high quality parts.

CATIA – Multi-Axis Surface Machining 2 (MMG)

Easily defines NC programs dedicated to machining multiple surface and curves of 3D parts in multi-axis mode. It offers 5-axis simultaneous surface machining operations and a variety of tool axis strategies including dynamic tool axis inclination for collision avoidance. As a complementary product to CATIA – 3-Axis Surface Machining 2 (SMG), MMG extends 3-axis surface machining to multi-axis machining. Furthermore, it takes advantage of the intuitive user interface based on graphic dialogue boxes for quick tool path creation, and the tight integration between tool path generation and verification including material removal simulation.

CATIA – Multi-pocket Machining 2 (MPG)

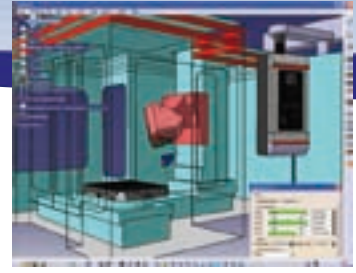
Delivers a unique on the market process focused solution to machine multi-cavity parts such as mechanical prismatic parts or aerospace structural parts. This breakthrough solution delivers to NC programmers the possibility to machine multi-cavities parts with a mix of roughing and finishing toolpaths. This power machining operation enables to machine the part in a global and automatic way that drastically reduces the programming time. In addition, CATIA – Multi-Pocket Machining 2 (MPG) takes advantage of the CATIA V5 standard knowledgware capabilities and the associativity with CATIA design products allows efficient change management.

CATIA – Prismatic Machining Preparation Assistant (MPA)

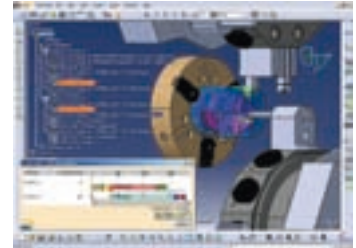
Delivers functions to prepare a design part for prismatic machining through geometrical machining features recognition.

CATIA – Prismatic Machining Preparation Assistant (MPA) helps the NC programmer to make the link between design and manufacturing. It provides a set of functions that generate all prismatic machining features of the design part to be machined. Therefore it builds a real manufacturing view of the design part with all the drilling and milling features to be machined. Thanks to its machining features recognition embedded technology, CATIA – Prismatic Machining Preparation Assistant (MPA) allows machining features creation with all kinds of CATIA design parts, even those with no design feature specifications.

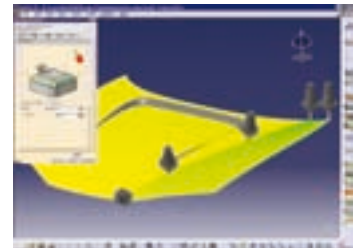
CATIA – Prismatic Machining Preparation Assistant (MPA) is totally integrated with CATIA – Prismatic Machining (PMG) product. It dramatically reduces programming times by automatically building up all geometric areas that must be machined with prismatic machining operations, decreasing time spent in geometry selections. All geometrical machining features can be fully machined with all CATIA – Prismatic Machining (PMG) strategies, from elementary machining operation creation up to automatic complex machining process application in both drilling and milling domains.



CATIA – NC Machine Tool Builder 2 (MBG)



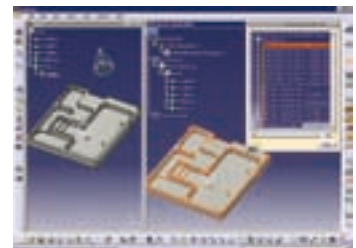
CATIA – Multi-Slide Lathe Machining 2 (MLG)



CATIA – Multi-Axis Surface Machining 2 (MMG)



CATIA – Multi-pocket Machining 2 (MPG)



CATIA – Prismatic Machining Preparation Assistant (MPA)

Products

CATIA – NC Machine Tool Simulation 2 (MSG)

NC Machine Tool Simulation easily validates the machining setup for selected NC machines and tool paths, during machining operation definition. It enables the NC programmer to assign a virtual machine to a part operation, simulate selected tool paths with the machine, determine interferences, modify tool paths or machining operations, and simulate machine motions and material removal based on ISO code.

NC Machine Tool Simulation dynamically detects collisions, if any, during simulation. It enables the NC programmer to re-visit these collisions at the end of a simulation run, and to modify machining operations to avoid collisions. It also detects axis limit errors, which can be interactively corrected by modifying the machining setup, thereby enabling the NC programmer to validate and finalise the part setup.

CATIA – NC Manufacturing Review 2 (NCG)

Offers basic NC capabilities such as tool path verification, material removal simulation, remaining material analysis, tool path edition and creation of shopfloor documentation. It provides the infrastructure for all V5 NC programming products and allows NC programmers or machine operators to review V5 part operations. Furthermore, different manufacturing data such as APT files, CL files and ISO code can be imported and reviewed. NCG also allows the re-use of CATIA V4 NCMILL and NCLATHE programs.

CATIA – NC Manufacturing Verification 2 (NVG)

Offers advanced tool path verification capabilities for multi-axis positioning as well as for multi-axis machining. It is a complementary product to CATIA – NC Manufacturing Review 2 (NCG). The accuracy of machined parts can be analysed either by detection and display gouges and remaining material, by pick point analysis or by measuring. Collisions between the tool or tool holder and part or fixtures are detected and graphically visualised. The results of a material removal simulation can be stored in a reporting file.



CATIA – Prismatic Machining 2 (PMG)

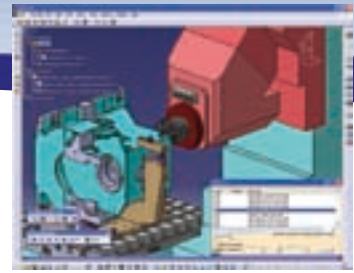
Easily defines drilling and 2.5-axis milling operations including support of High Speed Cutting technology. Quick tool path definition is ensured thanks to an intuitive user interface based on graphic dialogue boxes. Tools can be easily created and stored in tool catalogues. Entire manufacturing process is covered from tool path definition and computation, tool path verification including material removal simulation to NC code and shop floor documentation generation. Associativity with CATIA design parts allows efficient change management, high-level automation and knowledge re-use capabilities.

CATIA – 3 Axis Surface Machining 2 (SMG)

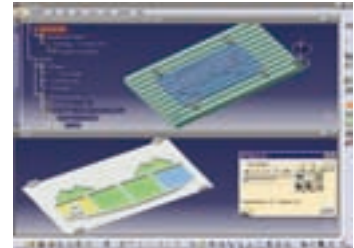
Easily defines 3-axis milling and drilling operations. High Speed Milling Technology is supported for all milling operations. Quick tool path definition is ensured thanks to an intuitive user interface based on graphic dialogue boxes. Tools can be easily created and stored in tool catalogues. Entire manufacturing process is covered from tool path definition and computation, tool path verification including material removal simulation to NC code and shop floor documentation generation. Instant Cycle Update Technology™ allows fast tool path update after modification. Associativity with CATIA design parts allows efficient change management.

CATIA – STL Rapid Prototyping 2 (STL)

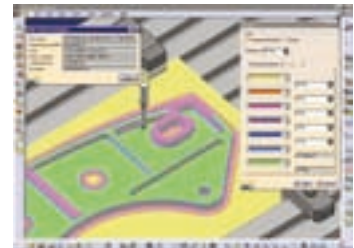
Creates STL files in a fast and accurate way by tessellation of CAD data. It allows the import of existing STL files, the display of meshes and the analysis of their quality. The product offers advanced tools to improve the quality of meshes by removing of triangles, by hole filling or by local or global re-meshing. In addition, it allows the creation of thin offsets to obtain a watertight solid and the split and merge of meshes. The meshes can be exported as standard binary STL file for a rapid prototyping machines.



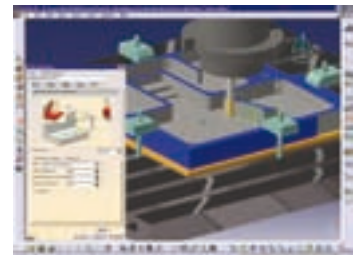
CATIA – NC Machine Tool Simulation 2 (MSG)



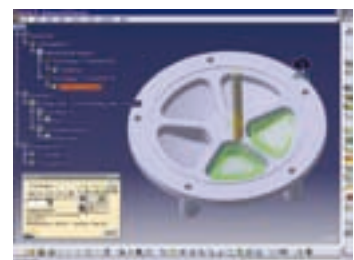
CATIA – NC Manufacturing Review 2 (NCG)



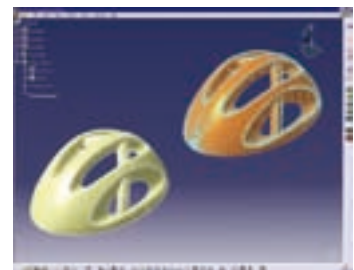
CATIA – NC Manufacturing Verification 2 (NVG)



CATIA – Prismatic Machining 2 (PMG)



CATIA – 3 Axis Surface Machining 2 (SMG)



CATIA – STL Rapid Prototyping 2 (STL)



For more information contact your IBM Marketing Representative, IBM Business Partner, or call one of the numbers below:

AMERICAS

USA (Toll-free) +1 800 395 3339
Canada +1 514 938 6718
Argentina +54 11 4319 6594
Brazil +55 11 3050 5542
Mexico +52 5 270 6426

ASIA / PACIFIC

Australia +61 2 9842 9555
China +86 10 6539 1188 ext. 3454
Hong Kong +852 2825 7614
India +91 20 649 724 / 649621
Indonesia +62 21 523 8622
Japan +81 3 3808 8510
Korea +82 2 3781 6290
Malaysia +60 3 7720 2069
New Zealand +61 2 9842 9555
Philippines +63 2 819 2345
Singapore +65 320 1234
Taiwan +886 2 725 9493
Thailand +66 2 273 4406

EUROPE / MIDDLE EAST / AFRICA

Austria +43 1 211 45 6963
Belgium +32 2 225 2901
CEMA +42 12 4954 1225
Czech Republic +420 2 272 131 742
Denmark +45 4523 3000
Egypt +20 539 2539
Finland +358 9 459 4151
France +33 1 4905 7064
Germany +49 1 805 426 756
Greece +30 1 688 1476
Hungary +36 1 382 5503
Israel +972 3 697 8586
Italy +30 800 753 196
Netherlands +31 20 513 3769
Norway +47 66 99 9361
Poland +48 22 878 6969
Portugal +34 91 397 72 66
Romania +40 0726 222 478
Russia +7 095 940 2000
Slovakia +421 2 4954 1455
Slovenia/Croatia/Serbia/Bosnia and Hercegovina +386 1 479 6676
South Africa +27 860 788 788
Spain +34 91 397 72 66
Sweden +46 8 793 4394
Switzerland +41 58 333 5370
Turkey +90 212 317 1305
United Kingdom +44 870 010 2510

IBM Eurocoordination
Product Lifecycle Management
Tour Descartes
La Defense 5
2, avenue Gambetta
92066 Paris La Defense Cedex
France

The IBM home page can be found at **ibm.com**
IBM, the IBM logo, ibm.com and the On Demand Business logo are trademarks of International Business Machines Corporation in the United States, other countries, or both.

CATIA® and Instant Cycle Update Technology are registered trademarks of Dassault Systèmes.

Other company, product and service names may be trademarks, or service marks of others.

References in this publication to IBM products, programs or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program or service is not intended to imply that only IBM products, programs or services may be used. Any functionally equivalent product, program or service may be used instead.

IBM hardware products are manufactured from new parts, or new and used parts. In some cases, the hardware product may not be new and may have been previously installed. Regardless, IBM warranty terms apply.

This publication is for general guidance only. Information is subject to change without notice. Please contact your local IBM sales office or reseller for latest information on IBM products and services.

Photographs may show design models.

© Copyright IBM Corporation 2005.
All Rights Reserved.

ibm.com/solutions/plm

