

## Equipment and Systems Engineering solutions



## CATIA V5

CATIA V5 is the leading product development solution for all manufacturing organizations, from OEMs, through their supply chains, to small independent producers. The range of its capabilities allows CATIA V5 to be applied in a wide variety of industries, such as aerospace, automotive, industrial machinery, electrical, electronics, shipbuilding, plant design, and consumer goods, including design for such diverse products as jewelry and clothing.

CATIA V5 is the only solution capable of addressing the complete product development process, from product concept specifications through product-in-service, in a fully integrated and associative manner. It facilitates true collaborative engineering across the multi-disciplinary extended enterprise, including:

- *Style and form design*
- *Mechanical design and equipment and systems engineering*
- *Managing digital mock-up*
- *Machining*
- *Analysis*
- *Simulation.*

CATIA products are based on the open, scalable V5 architecture.

By enabling enterprises to reuse product design knowledge and accelerate development cycles, CATIA helps companies speed-up their responses to market needs and frees end-users to focus on creativity and innovation.

[ibm.com/software/plm](http://ibm.com/software/plm)



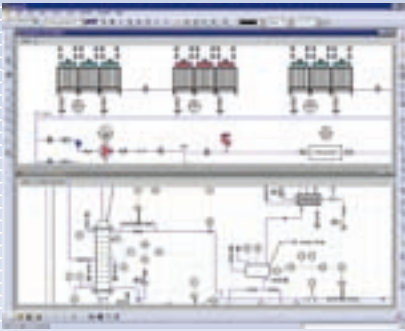
## Equipment and Systems Engineering solutions

CATIA V5 Equipment and Systems Engineering solutions provides a set of products allowing simultaneous design and integration of electrical, fluid and mechanical systems within a 3D digital mock-up while optimizing space allocation. It includes products for optimizing plant layouts, creation of circuit boards and design of structural products. These solutions enrich your product design in any industry. For example, fuel/brake systems for aircraft and automotive, HVAC/piping for shipbuilding and chemical and petroleum industries, tooling structure for industrial machinery and circuit boards for electronics.

Product highlights include:

- **A set of electrical products to address 2D and 3D requirements—**  
 CATIA V5 electrical products provide the necessary tools for managing the electrical behavior of components and their integration into a 3D digital mock-up. A bi-directional interface between CATIA V5 and CAD-based electrical systems defines the electrical behavior of mechanical parts and assemblies for electrical devices. They also manage the definition of electrical wires within the digital mock-up. A relationship can be set between 2D logical design and 3D digital mock-up to ensure consistency of both schematic and physical representations.
- **An advanced common platform for all CATIA V5 diagramming applications—**  
 Based on CATIA Piping and Instrumentation diagrams and CATIA HVAC diagrams as the common platform for all 2D logical schematic tools (including tubing, waveguide, electrical connectivity), these applications are a base for all diagramming systems. Integrated into the rest of the CATIA V5 platform, they allow the user to define relationships between the 2D logical design and 3D allocation.
- **Solutions to create, manage and analyze documents, equipment and systems—**  
 CATIA V5 provides a complete set of tools to satisfy the lifecycle requirements of manufacturing plant equipment designs and tubing, piping and HVAC designs.
- **The ability to manage and optimize space allocation for equipment and systems—**  
 Users can create and manage their system pathways to ensure space reservations and allocations. Using these products customers can optimize their electrical system routing layouts for them to automatically follow functionally defined pathways.
- **High productivity focus on ship design and systems integration—**  
 The consistent and scalable nature of the CATIA V5 solution set delivers unprecedented capability to large-scale projects. It supports shipbuilding with specific applications for key processes in the ship design lifecycle. Many CATIA V5 applications also include features that support requirements specific to the industry. Specification-driven design ensures compliance with project standards and 2D logical design can drive the 3D definitions. Use these specification-driven design features to prevent using 3D equipment if it is not part of the 2D P&ID diagram, for example.
- **Tools that can be used from virtual product to virtual plant—**  
 Plant layout tools in this solution set combine the disciplines of civil engineering and manufacturing engineering in one seamless approach.

## Configurations



*CATIA—Systems Diagrams 2 (DI2)*



*CATIA—Electrical System Functional Definition 2 (EF2)*

### **CATIA—Systems Diagrams 2 (DI2)**

Provides the necessary infrastructure in one seat for designers involved in piping and instrumentation engineering, tubing, waveguide, HVAC and electrical cable definition. As a CATIA P2 configuration, this solution offers integration tools that are compatible with CATIA—CADAM Drafting (CCD) and CATIA V4. It includes the CATIA—System Diagram 2 (SDI) product with its intelligent diagram applications and CATIA—Interactive Drafting product (ID1) for enhanced diagram drawing capabilities. This configuration is designed for use together with CATIA—Piping and Instrumentation Diagrams 2 (PID), CATIA—Tubing (TUD), CATIA—Waveguide (WGD), CATIA—HVAC Diagrams 2 (HVD) or CATIA Electrical Connectivity Definition (ELD) products.

### **CATIA—Electrical System Functional Definition 2 (EF2)**

Provides all the necessary tools in one seat for designers involved in the design and management of functional electrical systems and their integration in a digital mock-up environment. It also addresses the first stage in the electrical system engineering process.

### **CATIA—Electrical Wire Harness Installation 2 (EI2)**

Provides all the necessary tools to create and manage electrical wires and harnesses in one seat. Its comprehensive package of 3D advanced products allows the user to design physical harnesses within a 3D mock-up environment. At the same time, it manages the definition of electrical wires within the digital mock-up according to the functional definition of electrical signals. Its Electrical Library provides mechanical parts and assemblies with electrical behaviors for the user to define electrical devices. This, in turn, ensures a tight relationship between 3D physical implementation and its logical electrical representation.



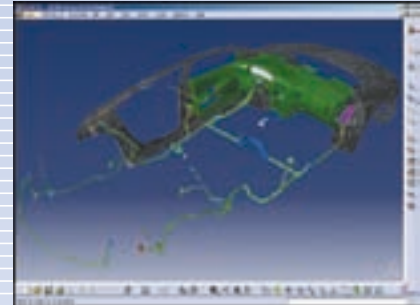
This configuration also makes up a set of core CATIA tools that perform advanced 3D design of parts and assemblies in a full-scale digital mock-up environment and generate production drawings. In addition, it includes integrated realtime rendering capabilities. Basic knowledge capabilities provided through CATIA—Knowledge Expert 1 (KE1) enable designers to import and use corporate knowledge stored in rule databases to ensure design consistency and quality. As a CATIA P2 configuration, this solution offers integration tools that are compatible with CATIA V4. It also includes data interfaces to the most frequently used industry standards, including IGES and CADAM drawings for smooth and seamless collaboration.

#### **CATIA—Electrical Signal Routing 2 (ER2)**

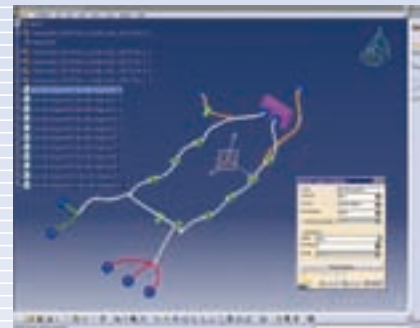
Provides all the necessary tools in one seat for designers and specialists involved in the advanced integration of electrical system engineering products or processes. These mainly include electrical processes, from functional design to wiring management and integration. As a CATIA P2 configuration, this solution offers integration tools that are compatible with CATIA V4.

#### **CATIA—Plant Layout 2 (PL2)**

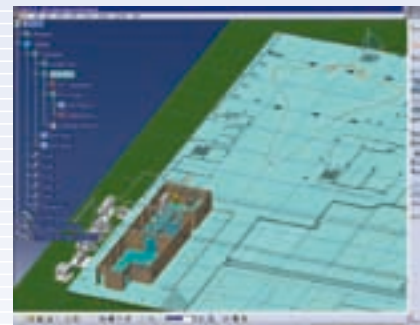
Provides all the necessary tools in one seat to produce and validate plant layout designs in a 3D digital mock-up environment for plant layout and routing systems. It allows for easy and constant evolution from 2D drawings to 3D layouts (thus protecting previous work) and from preliminary designs to the realization of their actual geometry. It delivers a quick and easy-to-use solution for companies to optimize their factory production and output. As a CATIA P2 configuration, this solution offers integration tools that are compatible with CATIA V4. It also includes data interfaces to most frequently used industry standards, including CADAM drawings.



*CATIA—Electrical Wire Harness Installation 2 (EI2)*



*CATIA—Electrical Signal Routing 2 (ER2)*



*CATIA—Plant Layout 2 (PL2)*

## P1 Products

### **CATIA—Circuit Board Design 1 (CBD)**

Enables the user to design circuit boards in the context of the overall mechanical design. Through the bi-directional interface (Intermediate Data Format (IDF)) with industry standard electrical CAD systems, the user can retrieve the design of its electronic components to create a complete digital mock-up of the Printed Circuit Boards (PCB). This enables him to analyze if the design of the PCB fits inside its mechanical environment. The interface also enables the user to send pertinent information, such as 'board outlines' and 'keep out' areas of spatial and technological constraints, back to the electrical CAD system.

### **CATIA—Electrical 3D Design and Documentation 1 (EC1)**

Provides to F&A and Consumer Goods markets a powerful dedicated 3D harness design and documentation toolset. Based on functional specifications imported from schematic systems the user can easily define the electrical system in the 3D digital mock-up. Out of this the user can easily generate harness manufacturing documentation. This new end-to-end product enables the user to reduced time and cost for creating its electrical system both in the DMU to avoid interferences and to create up to date manufacturing documentation.

Integration with schematic data insures that physical 3D Design is compliant with Electrical specifications and allows to automatically compute wire length in order to start manufacturing without any physical mock-up and to generate the correct harness diameter based on the wire content of the bundle.

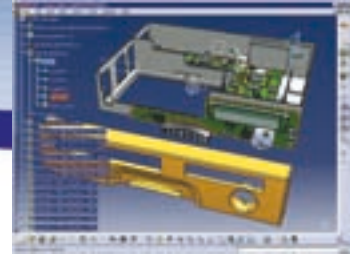
CATIA—Electrical 3D Design and Documentation 1 (EC1) takes full advantage of its integration within mechanical assembly, improves productivity by allowing users to automatically update Electrical wiring data. Accurate definition of the 3D Electrical systems guarantees that all installation constraints (for example, clashes) are solved in the DMU, providing huge gains as there is no more needs of Physical mock-up.

All design changes in 3D Harness are automatically propagated in documentation allowing time saving to maintain up to date documentation. Fully integrated with CATIA 2D drafting capabilities, CATIA—Electrical 3D Design and Documentation 1 (EC1) allows user to generate a dedicated representation of electrical components in 2D.

The provided functionality and the integrated concept of Electrical 3D Design and Documentation 1 (EC1) makes it a dedicated toolset for the Consumer Goods and F&A industries providing the right tools for their specific electrical requirements.

### **CATIA—Plant Layout 1 (PLO)**

Enables organizations to optimize their manufacturing plant layout. This product is one piece of Dassault's integrated Digital Manufacturing Solutions. It deals specifically with the 'spatial organization' and components of the plant, allowing quick easy layout and downstream evolution of the layout design. Through the CATIA V5 integrated product environment, users have a seamless solution to address all their manufacturing environment needs. They have the tools necessary to optimize production facility layout, leading to optimized factory production and output.



CATIA—Circuit Board Design 1 (CBD)

CATIA—Plant Layout 1 (PLO) provides an accessible solution for departments of small and medium enterprises. Its friendliness, intuitiveness, and ease of use makes it possible for inexperienced users to use the system with a minimal cost of implementation. The complete layout of the facility can be driven almost completely with the mouse and the product has a user interface that helps users make the transition from traditional 2D layout to 3D.

With the intelligence behind the V5 Plant Layout model, plant designers and systems layout design teams can identify and solve problems with the layout or production process long before equipment is installed or moved inside the plant. The software enables users to not only complete designs faster, but also to significantly improve the quality of their designs. Today, every manufacturing company is looking for new methods to reduce the time it takes to ramp-up, reduce the number of problems on the production floor including downtime, and get products to market faster. Dassault's Digital Manufacturing Solutions, which include the CATIA—Plant Layout 1 (PLO) product line, assist companies in achieving these objectives.

### **CATIA—Systems Routing 1 (SRT)**

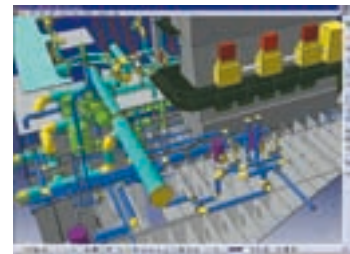
Is a conceptual design application that enables system planners to reserve the space needed for eventual functional and detail layouts of HVAC, raceways, piping and tubing. One can reserve the proper volumes and then let other groups and suppliers further define and route their systems within the limits. Interferences are avoided and different disciplines can be free to optimize their designs knowing that their spatial needs and manufacturing and erection sequences have been taken into account. CATIA—Systems Routing 1 (SRT) product gives users the power to manage their system components from initial design to plant operations, in a way that is completely adapted to the way you work.



CATIA—Electrical 3D Design and Documentation 1 (EC1)



CATIA—Plant Layout 1 (PLO)



CATIA—Systems Routing 1 (SRT)

# Products

## **CATIA—Electrical System**

### **Functional Definition 2 (EFD)**

Is dedicated to the functional design of electrical systems and addresses the first stage in the electrical system engineering process.

This product is a light weight, portable, multi-platform application. It provides an open architecture to integrate customer-defined commands and dynamically display customer defined attributes.

EFD allows engineers to design and formalize electrical systems using Excel-like form views. It also provides users with the ability to pre-visualize system assemblies.

Neutral ASCII formats (CSV like format) can be imported and exported, and EFD provides advanced navigation capabilities. It also features links to physical V4 libraries, with access driven by functional specifications. In addition, users can analyze and resolve external intersystem links.

## **CATIA—Electrical Library 2 (ELB)**

Allows users to create and manage catalogs containing electrical components. This product extends mechanical parts and assemblies with electrical behaviors to define electrical components, such as connectors and equipments. These devices can be stored in catalogs in the same way as mechanical parts/assemblies.

This includes electrical properties and attributes. When the components are placed from the catalog in the 3D digital mock-up, it takes into account all pre-defined mechanical constraints, this allowing a correct use/placement of the devices. Typically this product will be used together with CATIA—Electrical Harness Installation 2 (EHI) to provide the electrical designer a comprehensive 3D bundle definition.

## **CATIA—Electrical Harness**

### **Installation 2 (EHI)**

Is a product dedicated to the design of physical harnesses within the context of the 3D digital mock-up. Natively, the mechanical context is used as an input for electrical design and then to obtain a complete integration. Easy modifications and associations between the 3D environment and the harness are available. For instance, CATIA—Electrical Harness Installation 2 (EHI) provides unique slack management capabilities and an unconstrained derivation point. Complete integration between the functional and physical definitions of the electrical harness is provided. Due to the integration with mechanical assemblies, electrical harnesses can be connected either to mechanical parts or electrical devices.



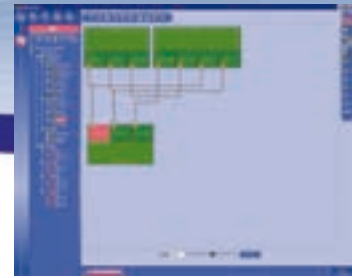
### **CATIA—Electrical Wire Routing 2 (EWR)**

Generates electrical wires within the digital mock-up, according to the functional or wiring specifications. The wires are routed according to specifications coming from external electrical CAD systems or the functional definition coming from the CATIA—Electrical Functional Definition (EFD) product. The wires are generated in a bundle network designed with the CATIA Electrical Harness Installation 2 or through a space reservation network defined by CATIA—System Space Reservation 2 (SSR). CATIA—Electrical Wire Routing 2 (EWR) allows users to capture and reuse corporate know-how during the routing process. Analysis capabilities such as bundle content are provided as well as reports about wire routing for harness manufacturing.

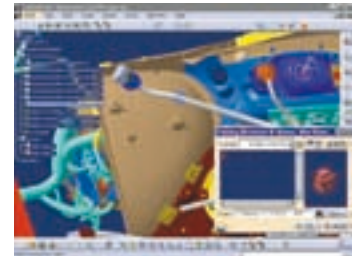
### **CATIA—Electrical Harness Flattening 2 (EHF)**

Provides user with flattening of 3D Electrical Harnesses created with CATIA—Electrical Harness Installation 2 (EHI) to produce 2D associative drawings for inspection and documentation purpose. CATIA—Electrical Harness Flattening 2 (EHF) extracts 3D Electrical data and provides a flattened view of the Electrical Harness. User is provided with a set of tools to manipulate bundle segments in term of position to reach the adequate solution.

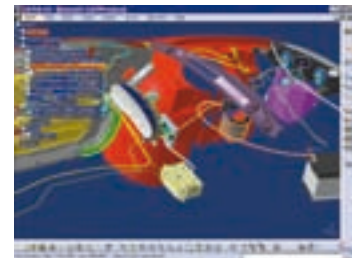
CATIA—Electrical Harness Flattening 2 (EHF) enables users to generate 3D flattened view of his harness. Therefore, he can decide that a bundle segment that is very rigid must keep its original bended shape. 3D Mechanical constraints defined with CATIA—Electrical Harness Installation 2 (EHI) are preserved, so that bend radius and length of bundle segment are still constrained. The product is fully integrated with CATIA—Electrical Harness Installation 2 (EHI). Besides, the natural integration with Interactive Drafting 1 (ID1) allows user to define and manage the relevant set of annotations and dimensions to create full reports for documentation.



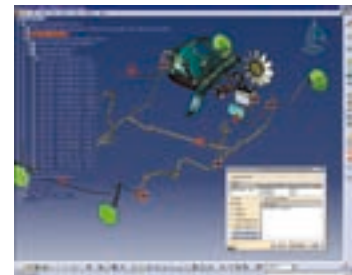
*CATIA—Electrical System Functional Definition 2 (EFD)*



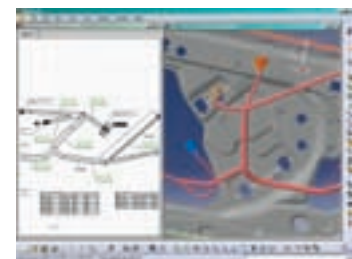
*CATIA—Electrical Library 2 (ELB)*



*CATIA—Electrical Harness Installation 2 (EHI)*



*CATIA—Electrical Wire Routing 2 (EWR)*



*CATIA—Electrical Harness Flattening 2 (EHF)*

## Products

### **CATIA—Structure Functional Design 2 (SFD)**

Provides a set of tools for structure designers who must complete their preliminary-draft before getting into the detailed design operations.

CATIA—Structure Functional Design 2 (SFD) enriches CATIA—Structure Conceptual Design 2 (SCD) supporting the initial structural definition of the interior of 3D volumes. For shipbuilders, these tools are used to develop the ships scantling, (for example, the way the ship is stiffened). For large equipment designers, these tools are used to define the initial materials to build vessels, tanks or other interior elements. CATIA—Structures Functional Design 2 (SFD) functions define plate thickness, adding stiffeners and pillars or stanchions.

Users can then calculate the strength of the structure, to get required approval of the basic design to extract early weight, material and labor estimates.

### **CATIA—Compartment and Access 2 (CNA)**

Is dedicated to the definition of compartment and access objects within a ship design. CATIA—Structural Preliminary Layout 2 (SPL) is the primary input design for the compartment and access operations. Specifically, the hull wrapping surface and molded forms (decks and structural bulkheads) from the SPL Design will be used/required for several of the CATIA—Compartment and Access 2 (CNA) commands.

CATIA—Compartment and Access 2 (CNA) workbench provides the user with the ability to define wall systems/non-structural bulkheads within their design. From these wall systems, the user can generate extensive compartment definitions including compartment boundary definitions. In addition, the user may place access objects such as closures, stairs or ladders within their design. The compartment and access

objects includes both a geometric representation and a technological representation (type and attributes) of the object. This allows both geometry and technological query and analysis on compartment and access related objects.

As part of the design process, the user may also define and generate reports based on any compartment and access objects and use the standard CATIA V5 Drafting tools to generate detailed drawings.

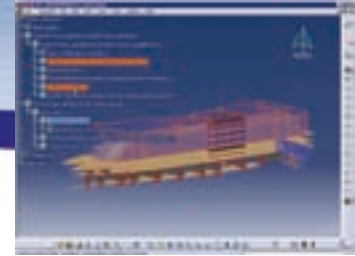
The integration with CATIA V5 applications give the user the benefit of a comprehensive solution for the complete Compartment design process. The compartment definitions are defined as part of the conceptual design of the ship and may be used by downstream design processes to help define and organize further refinement of the design. This integration gives the user a powerful set of tools to help contribute to the overall ship design process.

### **CATIA—Ship Structure Detail Design 2 (SDD)**

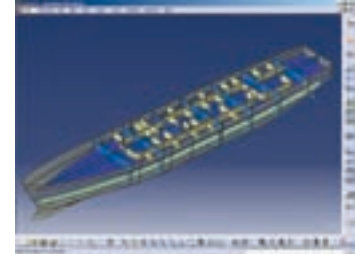
Is used to complete design of heavy structures with realistic plating and stiffening elements. It provides industry specific features to create hull structure detailed parts.

The full integration of CATIA—Structure Functional Design 2 (SFD) and CATIA—Ship Structure Detail Design 2 (SDD) allows user to retrieve Design block information, that was previously defined and assessed, to perform the detailed design of the structure. The application provides productive tools and environment in order to manage structural systems and connections and to create physical plates and shapes.

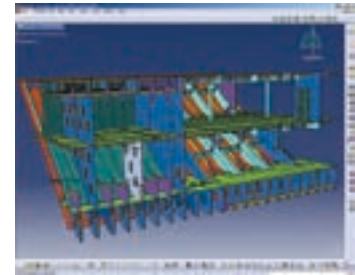
When used in concurrent engineering with CATIA—Structure Functional Design 2 (SFD) and CATIA—Structure Preliminary Design 2 (SPL), CATIA—Ship Structure Detail Design 2 (SDD) delivers ship builders with an end-to-end solution that covers the industrial process from concept to manufacturing.



*CATIA—Structure Functional Design 2 (SFD)*



*CATIA—Compartment and Access 2 (CNA)*



*CATIA—Ship Structure Detail Design 2 (SDD)*

# Products

## **CATIA—Electrical Connectivity Diagrams 2 (ELD)**

Is designed to allow customers to create and manage logical designs of power distribution and command systems using industry standard conventions, terminology and practices. In addition, captured intelligence, in the form of smart diagrams, can be reused for downstream design processes, providing additional benefits to customers' overall design processes.

CATIA—Electrical Connectivity Diagrams 2 (ELD) can be used to create and manage logical 3D Plant and Ship designs, such as Atomic power plants, electrical distribution (EDF, SNCF), special machines, automation lines and robot integration.

A CAA partnership with EDSA Micro Corporation provides add-on capabilities to the schematic to satisfy quality and reliability requirements.

## **CATIA—Electrical Cableway Routing 2 (ECR)**

Add-on of CATIA—Systems Space Reservation 2 (SSR), allows user to define 3D implementation for all existing electrical components defined in the electrical diagrams.

ECR automatically manages creation of reservation items and placement according to electrical connectivity information (diagrams) and compartment definition. Users can solve complex cable routing problems within the context of the digital mock-up.

Using CATIA—Electrical Cableway Routing 2 (ECR), designers can integrate both electrical and mechanical behaviors, capitalizing on CATIA V5 knowledge-based applications.

## **CATIA—HVAC Diagrams 2 (HVD)**

Product provides customers with a complete set of tools to create and manage logical designs of HVAC systems using industry standard conventions, terminology, and practices. The tools are focused on creating an intelligent diagram that captures all appropriate design information. This intelligent diagram capability enables the user to create and validate their designs more productively. Additionally, the captured intelligence can be reused for downstream design processes, providing further benefits to the customer's overall business processes.

CATIA—HVAC Diagrams 2 (HVD) supports the definition of HVAC diagrams. This involves general layout tools to place and locate equipment and the creation and management of duct lines. In addition, full capabilities are provided to quickly annotate diagrams with intelligent annotation, query design information, and generate appropriate report information. All these design tools employ a highly intuitive and productive user interface that allows users to, modify, and manage their designs quickly and easily.

CATIA—HVAC Diagrams 2 (HVD) product is integrated with the 3D HVAC Design 2 product. This function enables the designer to use a HVAC Diagrams design to directly drive the creation of the 3D detailed design using the HVAC product. The overall integration between the 2D and 3D products provides tremendous benefit to a customer's design process because it ensures the quality of the design and significantly improves user productivity.

Together with Dassault's Data Management offerings, the CATIA—HVAC Diagrams 2 (HVD) products give users the power to manage their systems from initial design to ship or plant operations, in a way that is easily adapted to how the customer works.

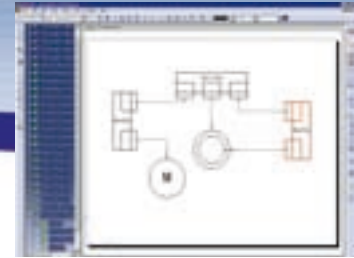
### CATIA—HVAC Design 2 (HVA)

Product creates and manages physical designs of HVAC systems using industry standard conventions, terminology, and practices. The tools are focused on creating an intelligent HVAC layout that captures all appropriate design information. This intelligent HVAC design capability enables users to create and validate their designs more productively. In addition, the captured intelligence can be reused for downstream design processes, providing further benefits to the customer's overall business processes.

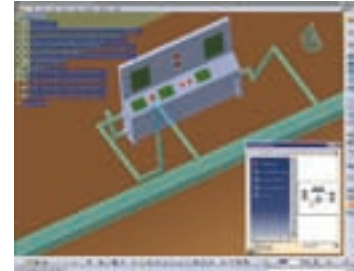
CATIA—HVAC Design 2 (HVA) features 2D/3D integration and this new capability optimizes the design process by providing the ability to propagate and streamline the data from the functional diagram to the 3D detailed design. Additionally, it integrates the two design stages and ensures that the design intent is captured at the detail design phase. Users can also access HVAC lines and parts for 3D specification-driven design. HVAC schematic-driven design dynamically maintains the consistency between the information in the HVAC schematic and the 3D design.

Easy to use validation tools allows the designer to highlight the consistency between functional and physical design. This level of integration delivers tremendous benefits to a customer's design process as it not only ensures the quality of the design but significantly improves productivity and reduces cycle time.

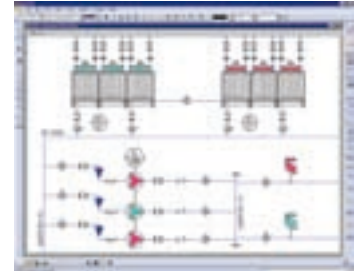
CATIA—HVAC Design 2 (HVA) provides general layout tools for intelligent placement of parts and automatic placement of components as well as the creation and management of duct lines. A full set of routing and parts placement methods allow users to choose the one that is right for a given context. Specification-driven design is used where required to ensure compliance with project standards. Function-driven design is used to assure that the design intent is available for any modification scenario. Integration with a design rules engine allows automation of the design process, and guarantees that company standards are followed throughout the design process. This integration will also provide high productivity and will reduce cycle time. In addition, full capabilities are provided to quickly query design information, and generate appropriate reports.



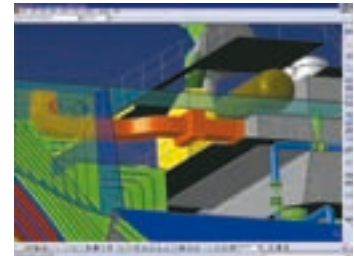
CATIA—Electrical Connectivity Diagrams 2 (ELD)



CATIA—Electrical Cableway Routing 2 (ECR)



CATIA—HVAC Diagrams 2 (HVD)



CATIA—HVAC Design 2 (HVA)

## Products

The product's comprehensive and flexible setup functions include an easy way to define project standards and catalogs that help users get into production rapidly. The product comes with a starter HVAC parametric parts catalog. All these design tools employ a highly intuitive and productive user interface that allows users to create, modify, and manage their designs quickly and easily.

Together with CATIA Version 5's data management offerings, CATIA—HVAC Design 2 (HVA) gives users the power to manage their systems from initial design to ship or plant operations in a way that is easily adapted to how the customer works.

### **CATIA—Piping & Instrumentation Diagrams 2 (PID)**

Provides customers with a complete set of tools to create and manage logical diagrams of piping systems using industry standard conventions, terminology, and practices. The tools are focused on creating intelligent diagrams that capture the design standard and connectivity (for example, equipment to equipment) of pipe routes.

This intelligent diagram capability enables users to create and validate their 3D piping designs more productively. Additionally, the captured intelligence in the diagram can be reused for downstream during the design processes thus providing further benefits by reusing data, automating part selection from catalogs and providing a functional check that the 3D design complies with the 2D logical specification. CATIA—Piping & Instrumentation Diagrams 2 (PID) provides general diagramming tools to place and locate equipment, and to define and manage piping line definition. In addition, instrument control loops on pipelines can be defined, created and managed.

PID functions provided methods to create intelligent annotations. They can be used to query design information, and to generate custom reports. All these design tools employ a highly intuitive and productive user interface that allows users to, modify, and manage their designs quickly and easily.

CATIA—Piping & Instrumentation Diagrams 2 (PID) allows when integrated with the CATIA Piping Design 2 (PIP) product automatic parts selection and placement, as well as check resulting designs, for compliance with the PID diagram. Pipe lines can be re-specified in PID and the 3D Piping Design updated. The overall integration between the 2D and 3D products provides tremendous benefit to a customer's design process because it ensures design quality, facilitates update and significantly improves user productivity.

### **CATIA—Piping Design 2 (PIP)**

Product creates and manages physical designs of piping systems using industry standard conventions, terminology, and practices.

The tools are focused on creating an intelligent piping layout that captures all appropriate design information. This intelligent piping design capability enables the user to create and validate their designs more productively. In addition, the captured intelligence can be reused for downstream design processes, providing further benefits to the customer's overall business processes.

CATIA—Piping Design 2 (PIP) features 2D/3D integration with CATIA—Piping and Instrumentation Diagrams 2 (PID). This new capability optimizes the physical design and layout process by providing the ability to propagate and streamline the data from the functional PID diagram to the 3D detailed design developed with PIP. Additionally, CATIA—Piping Design 2 integrates the two design stages (logical and physical) and ensures that the design intent is captured from the diagram at the detail design phase. Users can also access piping and instrumentation diagram lines and parts to automate the 3D Piping Design. When 3D Piping Design is driven from Piping and Instrument Diagrams, the consistency between the 3D piping and 2D piping diagrams is maintained. CATIA—Piping Design 2 (PIP) offers easy to use validation tools that highlight inconsistencies between functional and physical design. This level of integration delivers tremendous benefits to a customer's design process as it not only ensures the quality of the design but significantly improves productivity and reduces cycle time.

CATIA—Piping Design 2 (PIP) provides general layout tools for intelligent placement of parts, automatic placement of components such as bends, elbows, tees, and reducers. A full set of routing and parts placement methods allow users to choose the one that is right for a given context. Specification-driven design is employed where required to ensure compliance with project standards. Function-driven design is used to ensure that the design intent is available for any modification scenario. Integration with a design rules engine allows automation of the design process and ensures that company standards are followed throughout the design process. In addition, full capabilities are provided to quickly query design information and generate appropriate reports. The product's comprehensive and flexible set-up functions include an easy way to define project standards and catalogs that help users get into production rapidly. The product comes with a starter piping parts catalog based on American National Standard Institute (ANSI). All these design tools employ a highly intuitive and productive user interface that allows the user to create, modify, and manage their designs quickly and easily.



*CATIA—Piping & Instrumentation Diagrams 2 (PID)*



*CATIA—Piping Design 2 (PIP)*

## Products

Together with CATIA Version 5's data management offerings, gives users the power to manage their systems from initial design to ship or plant operations in a way that is easily adapted to how the customer works.

### **CATIA—Tubing Diagrams 2 (TUD)**

Creates and manages logical designs of tubing systems using industry standard conventions, terminology and practices. This intelligent diagram design capability enables the user to create and validate their designs. TUD supports the definition of Tubing Diagrams by providing general layout tools for equipment placement and location. It also allows users to create and manage tubing lines, annotate diagrams, query design information, and generate appropriate report information. These tools employ an intuitive, productive user interface. When integrated with the CATIA—Tubing Design 2 (TUB) product, the designer is allowed to use a Tubing Diagram design to directly drive the creation of the 3D detailed design.

### **CATIA—Tubing Design 2 (TUB)**

Creates and manages physical designs of tubing lines/systems using industry standard conventions, terminology, practices and company standards. Provided industry-oriented functionalities give users the ability to design the tubing systems in a realistic way. When the product is used with CATIA—Tubing Diagrams 2 (TUD) product, users optimize the design process by propagating and streamlining data and design intent, from the functional diagram to the 3D detailed design. Integrating the two design stages ensures the design intent is captured at the detailed design phase. Tubing lines and parts can be accessed for 3D specification/schematic-driven design, dynamically maintaining consistency between the schematic and 3D design.

One can annotate and validate the model, query data and generate appropriate report information with an intuitive and productive user interface.

### **CATIA—Waveguide Diagrams 2 (WGD)**

Product creates and manages logical schematics of waveguide systems. CATIA—Waveguide Diagrams 2 (WGD) is an intelligent diagram application enabling users to create and validate waveguide logical designs more productively. When used with the CATIA—Waveguide Design 2 (WAV) application, users can automatically input specification data captured in the diagram and use it to automate equipment placement, the selection of 3D components from catalogs, check waveguide schematic lines for completion, query parts and check that all components are functionally and physically correct. CATIA—Waveguide Diagrams 2 (WGD) provides general diagramming tools with industry standard symbols for defining all components, connections and sub-assemblies. Diagramming functions provide line, equipment and component definition, graphic editing, specification entry, quick copy, and off-page connectors for managing large diagrams. Customization tools adapt CATIA—Waveguide Diagrams 2 (WGD) to company graphic standards and project naming conventions.



### **CATIA—Waveguide Design 2 (WAV)**

Product creates and manages the physical designs of waveguide systems. Waveguide functions support the design of these electro-mechanical devices used to transmit and receive communication microwave signals. CATIA—Waveguide Design 2 (WAV) provides design tools that can detail both the mechanical guide components as well as the electrical and radio frequency cables. 3D design and 2D specification-driven functions facilitate the selection and detailing of castings, tubing, flanges, fittings and other sub-assembly hardware that define a complete waveguide system. A full set of routing and parts placement methods allow users to choose the one that is right for a given context. CATIA—Waveguide Design 2 (WAV) is fully integrated with the CATIA—Waveguide Diagrams 2 (WVD) application. CATIA—Waveguide Design 2 (WAV) provides general layout tools for intelligent placement of parts and automatic placement of waveguide components as well as the creation and management of waveguide lines.

### **CATIA—Systems Diagrams 2 (SDI)**

Product provides a common platform for CATIA diagram applications. This common platform encapsulates diagram functionality that is common to the various diagram applications. This common functionality is based on the concept of an intelligent diagram where appropriate design information is captured. CATIA—Systems Diagrams 2 (SDI) Product is not a stand-alone product. Specifically, this product by itself does not provide end user functionality. This product is used as a base for the:

- *CATIA Piping and Instrumentation Diagrams 2 (PID)*
- *HVAC Diagrams 2 (HVD)*
- *Waveguide Diagrams 2 (WGD)*
- *Tubing Diagrams 2 (TUD)*
- *Electrical Connectivity Diagrams 2 (ELD)*.

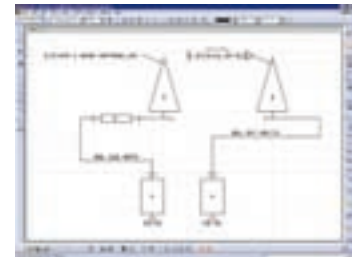
These products require this product for operation. Together with Dassault's diagram offerings, the Systems Diagram Product gives users the power to manage their complete diagram design and development.



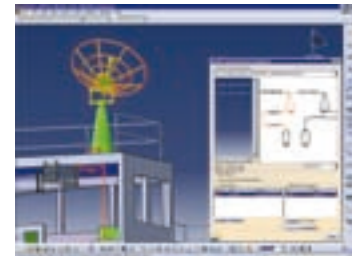
CATIA—Tubing Diagrams 2 (TUD)



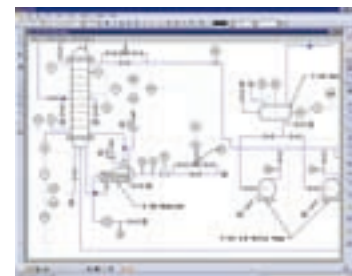
CATIA—Tubing Design 2 (TUB)



CATIA—Waveguide Diagrams 2 (WGD)



CATIA—Waveguide Design 2 (WAV)



CATIA—Systems Diagrams 2 (SDI)

## Products

### **CATIA—Equipment Arrangement 2 (EQT)**

Is used to build and manage all types of equipment and systems found in several products and production facilities. It uses standard conventions, terminology, and practices of those industries. CATIA—Equipment Arrangement 2 can be used to build and manage equipment such as boilers, pumps, and heat exchangers as well as brake units, valves and several control systems. The tools are focused on creating intelligent representations and arrangements of equipment with attached attribute data, allowing full specification, within the context of the overall system.

The product allows users to create, modify, manage and validate designs of associated systems more productively. Users can annotate the 3D model, query design data, and generate appropriate report information, using an intuitive and productive user interface. This capability, integrated with PDM, can be used for downstream product management processes throughout the product lifecycle. Integrated with the 2D Diagram applications it provides a powerful tool to place and manage your 3D equipments and systems.

### **CATIA—Hanger Design 2 (HGR)**

Provides customers with a complete set of tools to build and manage hangers needed to support 3D Systems, such as HVAC, piping, and electrical systems, including cable routing through hangers, using industry standard conventions, terminology, and practices. This product is tightly integrated with the Electrical Cable Routing product that provides the capability to easily route cables through a predefined hanger arrangement. Additionally, it is integrated with the pathway reservation product that permits the user to define the required space claim needed for interference checking.

Intelligent and powerful placement and modification tools are furnished allowing the user to define the necessary hanger arrangement required for supporting 3D Systems. Comprehensive tools are provided enabling the designer to customize hanger data model such as attributes and classes of hangers. This grants the ability to standardize attribute data required for query, extraction and reporting such as material take-off. Integration with the knowledge rules engine allows design validation, and guarantees that company standards are followed throughout the entire design process.

This captured intelligence can then be reused for downstream design processes, providing further benefits to the customer's overall business processes. The product's comprehensive and flexible setup functions include an easy way to define project standards and catalogs that help users get into production rapidly. The product comes with a starter parametric hanger parts catalog. All these design tools employ a highly intuitive and productive user interface that enables designers to create, modify, and manage their hanger arrangement quickly and easily.

Together with CATIA Version 5's data management offerings, the Hanger Design 2 product gives users the power to manage their systems from initial design to operations in a way that is easily adapted to how the customer works.

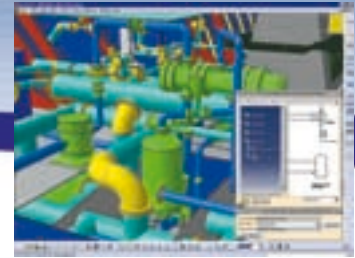
### **CATIA—Raceway & Conduit Design 2 (RCD)**

Provides layout tools for intelligent placement of parts and automatic placement of components. It also allows users to create and manage specification/function-driven physical designs of raceway and conduit systems, using industry standard conventions, terminology, and practices. The product includes a raceway and conduit design parametric parts catalog. It is integrated with electrical cable routing, through the defined Raceway and Conduit network, to provide an intelligent layout that captures design information. Integration with a design rules engine allows automation of the design process, and guarantees compliance with company standards. The captured design information and intelligence can be queried, extracted and reused for downstream processes. In conjunction with PDM, RCD gives users the power to manage their systems, from initial design to ship or IES/Plant operations, in a way that is easily adapted to how the customer works.

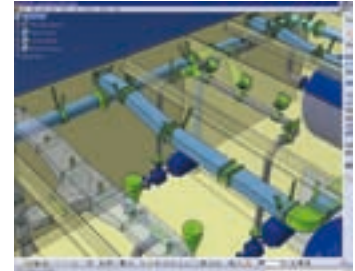
### **CATIA—System Space Reservation 2 (SSR)**

Provides an efficient and cost-effective way to create space for tubing and electrical systems. It enables the user to easily define a space reservation network, including components and pathways and to segregate space networks. The entire process is accomplished through a simple, highly intuitive interface, combining traditional 2D layout paradigms with full 3D capabilities for building a 3D digital representation of the design.

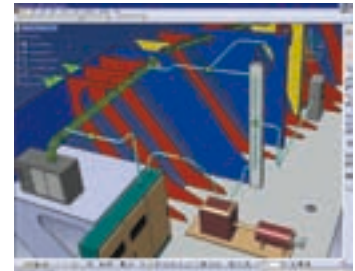
The product also enables the user to define lofted pathways that can be created dynamically in free space and on the fly. This powerful capability allows the designer to create pathway transitions among any combination of sections types, such as round to rectangular shapes.



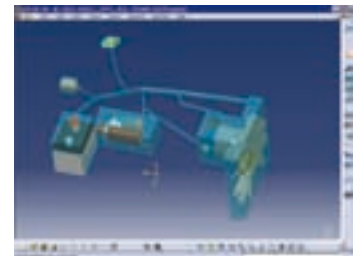
*CATIA—Equipment Arrangement 2 (EQT)*



*CATIA—Hanger Design 2 (HGR)*



*CATIA—Raceway & Conduit Design 2 (RCD)*



*CATIA—System Space Reservation 2 (SSR)*



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