



AVEVA

BROCHURE

AVEVA™ E3D Design

The most advanced 3D design solution for accurate, clash-free hull and outfitting basic design of ships and offshore vessels.

A sea of new obstacles are making marine projects more difficult to deliver: the increasing size and complexity of vessels, short lead times, the need for concurrent engineering, unclear or changing specifications, rising cost pressures, and globally distributed design and production processes running 24/7. With AVEVA E3D Design, we want to empower you with a more sophisticated and aligned engineering approach so that you can deliver high-quality projects on time and on budget.

AVEVA E3D Design overview

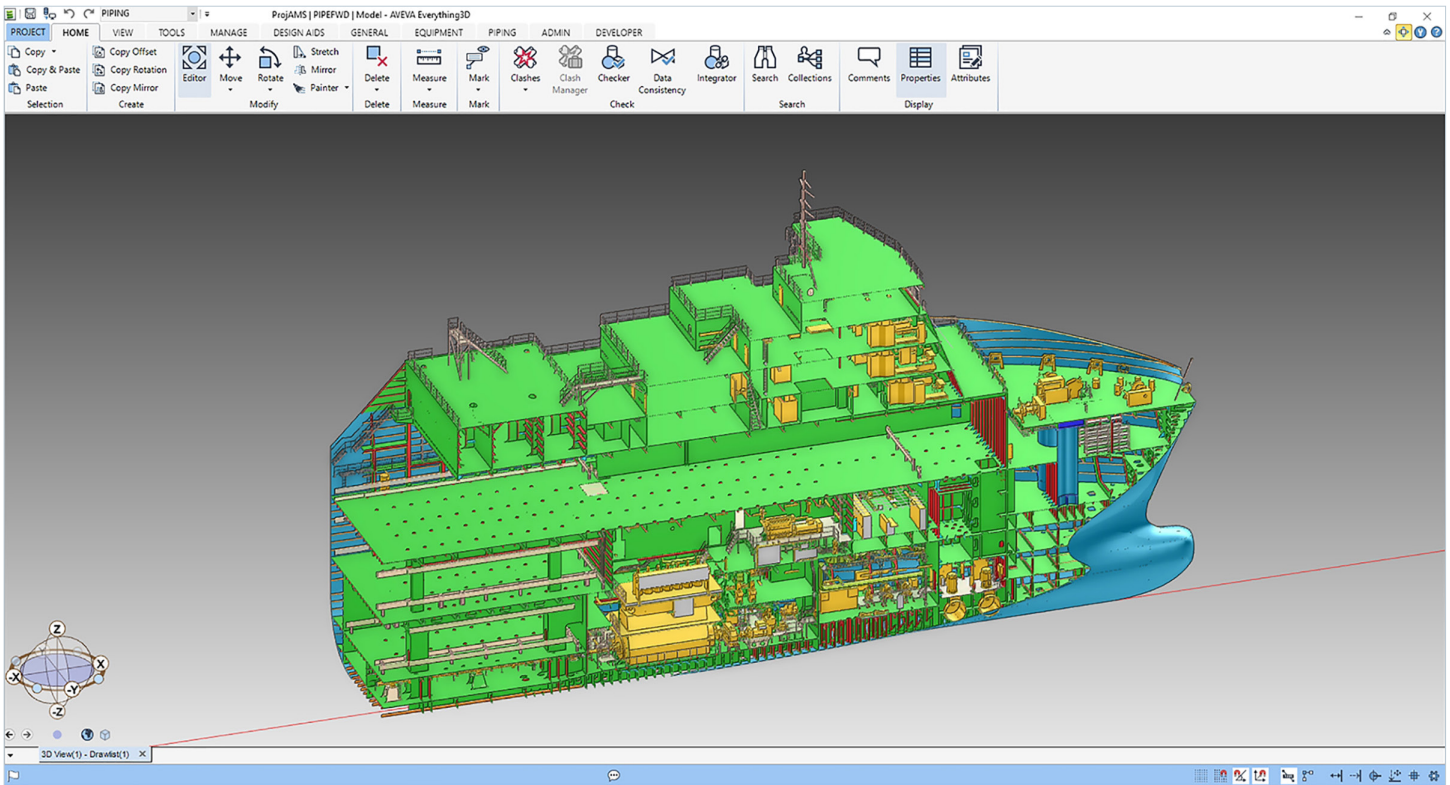
Ship design and construction engineers need to:

- Quickly identify design changes
- Work with multiple design teams around the world
- Achieve 3D coordination early in the design phase
- Issue and revise drawings mapped directly to the 3D model
- Manage changes in the design phase to maintain a consistent, error-free 3D model
- Get real-time feedback on the “as-built” captured data

If any of the above fail, costly rework is generated during fabrication and production.

AVEVA E3D Design capabilities for marine include the [AVEVA Hull Basic Design Module](#), used for the preliminary design of a ship's hull structure, and supporting key decisions regarding naval architectural characteristics, space management, outfitting design and drawings.

AVEVA E3D Design integrates with AVEVA solutions, providing extensive functionality. The integrated design also facilitates information exchange with many third-party systems, enabling it to be implemented into existing technical infrastructure with minimal risk.



A multi-discipline outfitting design based on real hull data.



Efficient outfitting and hull design

Accurate and clash-free design of piping, HVAC, cable trays and miscellaneous structures.

AVEVA E3D Design is the only 3D marine system for hull and outfitting basic design that enables the creation of complete, error-free, production-oriented 3D modelling of the vessel, with remote design synchronization capabilities.

Benefits of AVEVA E3D Design:

- Enables clash-free, multi-discipline 3D design and rapid generation of accurate drawings and reports to meet demanding project schedules
- Quickly develop the hull basic design model to serve design certification and preliminary analysis
- Reduces the costs, timescales and commercial risks for both new-build and brownfield capital engineering projects
- Automatically divides a ship's hull design into spaces, enabling the efficient design of the most complex ships. Logical dependencies between designed objects and the space attributes retain design intent while the hull layout evolves
- Provides best-in-class project execution capabilities, and collaboration with the global community of AVEVA users

Efficient collaboration and high productivity

An extensive catalogue enables predefined parametric components and objects to be quickly selected and positioned within the model, then automatically checked for clashes and for compliance with configurable design rules.

The new space management module enables more efficient collaboration as it facilitates work distribution, design review, reporting and design analysis.

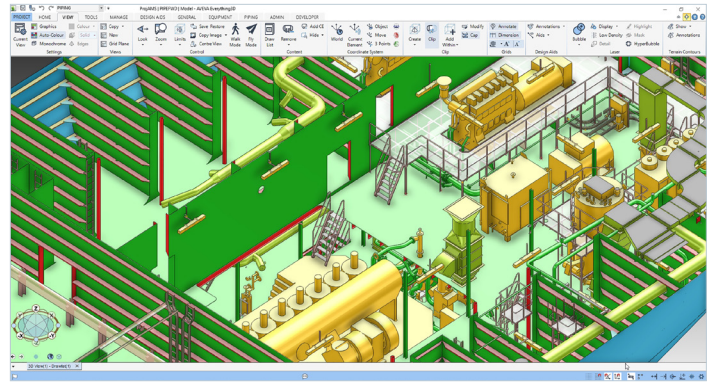
As the design evolves, changes can be highlighted and tracked, which make it easier to identify, manage and communicate the change across different disciplines.

The result is an accurate, high-quality design that minimizes construction costs and time, and avoids errors that can lead to costly rework in production.

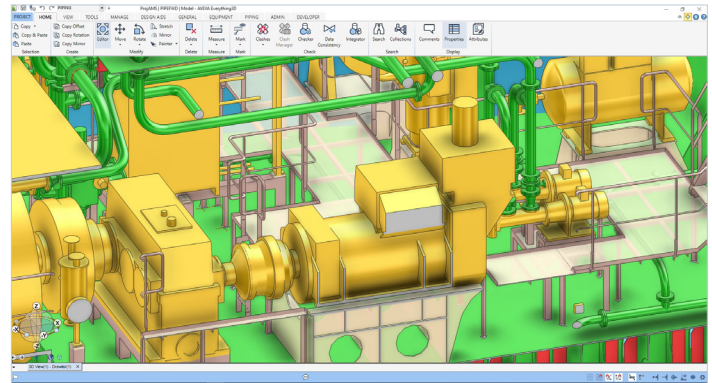
Business benefits

Reduce design man-hours

- Reduce design effort and man-hours with the highly efficient graphic user interface for both first-time modeling and modifications
- Create marine drawings directly from AVEVA E3D Design to enable effective production of outfitting and hull basic design drawings.
- Increase productivity when creating general arrangement-based drawings. For example, fire insulation plans can be created automatically.
- Enable advanced customization, based on 3D volumes of the ship
- Accurate-first-time design with design rules and checking functions, with fewer design iterations and minimized design rework
- Efficient, comprehensive clash detection enables costly on-site rework to be eliminated in the design stage



Clipped and detailed view of how you can model all your outfitting elements in the same environment



Detailed view of machinery, piping and structures designed in AVEVA E3D Design

- Integration with hull structure for references and penetrations
- Efficient hull basic design for the modelling of the preliminary hull structure, leading to structural analysis and design certification

Improve productivity

- Automatic, just-in-time creation of drawings and other production information direct from the project model minimizes revision work
- Our design for production concept, design rules and comprehensive production checks ensure that parts fit right the first time in production for outfitting
- Photorealistic laser scan data integrated into the design environment enables rapid, intuitive and accurate design of vessel modifications, and verification of construction status against the design intent as constructions progresses
- Optimum materials and resource use for maximum efficiency

Increase collaboration

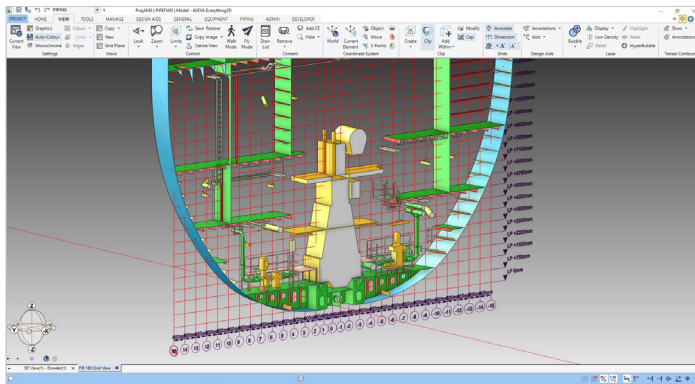
- Enable global design teams to work together as if in a single office
- Use of a common model database avoids design clashes by enabling better communication between hull and outfitting disciplines
- Build libraries of design assemblies or commonly used modules for reuse on new projects

Compliance

- Compare-and-update with schematics and engineering lists, enabling higher-quality design in fewer man-hours
- Change highlighting, tracking and status management enable efficient, collaborative compliance with design rules, best practice and contractual requirements
- AVEVA E3D Design is a scalable solution with no limit on project size or complexity

Easy to adopt and rapid project start-up

- Intuitive, easy-to-deploy staff training enables rapid start-up to full productivity
- Set up new projects in hours, not days, with efficient system administration



Separate view of a frame that you can work in details

Key features

Faster and more intuitive user interface

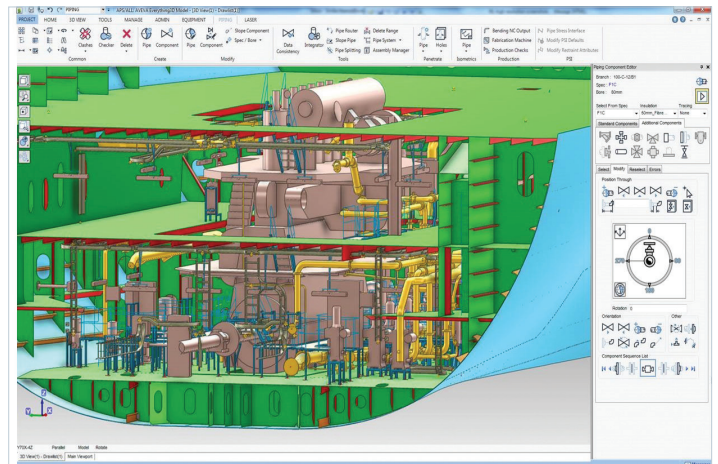
Fully interactive outfitting, easy-to-use 3D design environment provides every designer on the project with modern 3D graphical interaction tools. The graphical clarity of the user interface enhances 3D coordination capabilities providing full visibility of the entire design.

Easy configuration

AVEVA E3D Design can be customized by the user to suit individual, industry or project requirements, or to add further design rules or automation functions.

Basic design hull modeling – panel concept

An important feature of basic design hull modeling is the panel concept, which includes unified panels and clone panels. A panel is a functional structure ranging in size from a small, bracket-like structure, to the level of webs, girders, decks and bulkheads. A panel, with its plate parts, profiles, brackets, and so on, is the basic modelling unit in AVEVA E3D Design. Associated piece parts are generated automatically from the panels.



Hull in the 3D view

Object-centric data management

Designers construct a highly intelligent database for the whole ship, creating their specialists' parts of the design by placing instances of parametric components from a controlled catalogue. Each object, such as a valve, pump or pipe, has an associated, extensive library of attributes and association data. The project database that your team will create in this way becomes a digital asset of huge value to your business planning and modeling.

Design quality assurance

Intelligent clash detection and clash highlighting, both between individual design objects and between design objects and laser scans of as-built structure, help designers avoid clashes as they work.

Space management

Automatically divide a ship's hull design into spaces, enabling the efficient design of the most complex ships. Logical dependencies between designed objects and the space attributes retain design intent while the hull layout evolves. Designers can organize the design environment to suit their project requirements with flexibility to add new reporting and control capabilities.

Surface manager

With no additional license required, surface manager is fully integrated with AVEVA E3D Design. Designers can import surfaces from various formats and graphically display the shape of the ship geometry to check surface quality and to repair defects before they propagate in the design.

Change management

Conventional design issue, revision, and change control processes can all be applied efficiently, even on projects that have many hundreds of users. AVEVA E3D Design provides robust change management functions that enable designers to make and accommodate changes in a controlled manner, identifying at-a-glance things that have changed, and automatically creating an audit trail of changes as they work.

Integration with AVEVA engineering tools

The design process translates engineering information into 3D reality. AVEVA E3D Design enables data from engineering and schematic applications to be imported and to automatically create the corresponding 3D objects, ready for positioning in the model.

Three-way association between schematic, engineering and 3D data ensures that changes or inconsistencies are reflected in all until accepted or corrected. Compliance with open and industry standards further enables AVEVA E3D Design to work with data originating in many third-party applications.

AVEVA E3D Design works alongside AVEVA Marine, enabling you to create a fully clashable and drawable hull model.

Integration of laser scan data into the design environment

Laser scans of individual fabrications, modules or the current status of the as-built site can be rapidly imported for verification against the design model. Identify and resolve non-compliances and keep your project on schedule, using a design model that can be progressively updated to accurately reflect the true as-built construction.



Laser data integrated with the 3D model

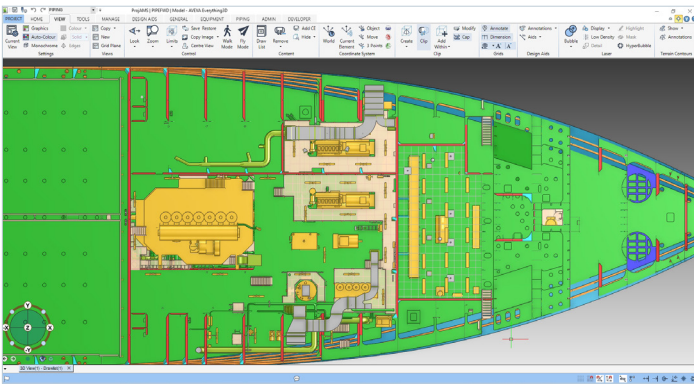
Laser data in drawings

Replace the huge number of hours wasted on modeling old vessels by adding up-to-date point cloud laser data directly into existing drawings.

In-context access to the full digital asset

The design in context capability enhances the design process by serving up relevant content from your digital asset to your design teams within AVEVA E3D Design, to improve the speed and reliability of their design decisions. The design in context capability creates a direct connection to the centralized digital asset repository (if available). When an object is selected in AVEVA E3D Design, the context panel dynamically updates a list of available content relevant to the selection, such as datasheets, vendor documentation, purchase orders, planning charts and calculation sheets.

This content can then be opened, in context to the selected object, via a new embedded universal viewer, ensuring decisions are made in relation to all available information.



Looking through clipped view of machinery room and various decks of the ship

Optimum use of design automation and rules

AVEVA E3D Design features extensive capabilities for design automation through the configuration of rules. These rules respect engineering boundaries and access rights. They build on the productivity advantages of rule-based design automation while ensuring that design authority for changes remains with the relevant responsible disciplines.

For example, automatic routing of pipes and cable trays in accordance with preconfigured rules is a popular feature in 3D design solutions. Yet this approach rarely creates an optimum design by itself.

AVEVA E3D Design enables a designer to switch between automatic routing to save time on simple or repetitive work, and intuitive manual adjustment tools to refine the routes ensuring the best overall-quality of the complete design.

Unrivalled design reuse

AVEVA E3D Design enables extensive sharing and reuse of data between projects as standard. Design and component information from previous outfitting projects can be reused or shared across multiple projects.

Utilities for changing pipe sizes or specifications enable rapid adjustment to the new project.

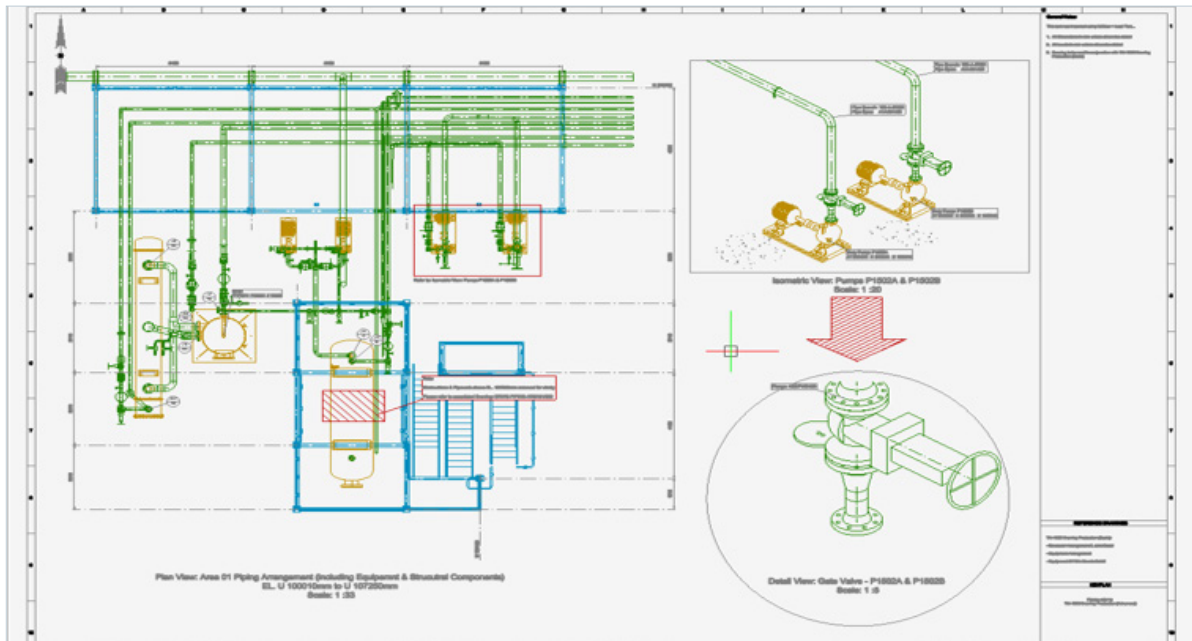
Configurable automation of deliverables

All deliverables – drawings, piping isometrics, bills of materials (BoMs) or reports – are generated directly from the definitive 3D design model, ensuring they are accurate and complete. AVEVA E3D Design's DRAW module also includes advanced 2D drafting tools that interact with the design model, enabling customers to quickly and easily add notes, sketches and dimensions without the need for a separate 2D drafting system.

Automatic cable routing

This standard feature enables instrumentation and/or electrical cables to be automatically routed into cable trays in accordance with preconfigured rules defining such parameters as tray fill levels, route selection and signal/power cable separation.

Cable definitions can be obtained from AVEVA™ Electrical and Instrumentation where used, or imported via Microsoft Excel from third-party systems. Accurate cable lengths, including any excess allowances, can be returned in the same ways for the creation of BoMs and drumming.



DRAW - Drafting integrated with the model

Import function

A general import function from Microsoft Excel allows large volumes of data from external sources to be analyzed online and bulk-loaded into the design.

Efficient management of subcontract work packages

Subcontracting work is common practice but requires the ability to manage the interface with the subcontractor and to validate their work before accepting it.

AVEVA E3D Design provides a unique extract functionality that allows a subcontractor to work independently, developing a package of design without impact on the master project model. Following approval of the work, it can be automatically incorporated into the project model.

Additional products

For new adopters of AVEVA E3D Design, with no existing AVEVA infrastructure, the following additional products are included to provide immediate and full value from the technology:

- AVEVA™ Administration for system administration and configuration
- AVEVA™ Catalogue for the definition of engineering specifications and component catalogues.

The following optional products are particularly recommended to extend capabilities and efficiency:

- AVEVA™ Global for the management of distributed, multi-location working

AVEVA E3D Design add-ons

AVEVA™ E3D Design Mobile

Access 3D designs from any global location with a tablet or mobile device to review and approve model updates, allowing for real-time response to accelerate project delivery from anywhere in the world.

AVEVA™ E3D Whitespace Optimizer

Free technical staff from the time-consuming, repetitive, detail-focused burden of checking and editing automatically produced drawings. AVEVA Whitespace Optimizer uses an artificial intelligence (AI) engine via our secure cloud platform AVEVA™ Connect, to locate and efficiently use drawing whitespace to autonomously clean-up annotations on drawing deliverables.

AVEVA™ Native Model Simplification

Import simplified versions of complex 3D CAD models of equipment items that have been created in external mechanical CAD (MCAD) Systems into AVEVA E3D Design, reducing design file sizes by orders of magnitude.

3DFindIt

A free add-on that provides users with access to Cadena's vast library of vendor-supplied, mechanical equipment models and data, which can be effortlessly integrated in 3D plant and ship models.

Training

To support our customers, AVEVA offers classroom training to gain further knowledge in AVEVA E3D Design.

Alternatively, if you would prefer a more flexible approach, we also offer self-training online in our secure AVEVA Cloud environment.

To learn more, explore AVEVA's product training resources,
please visit: aveva.com/en/training