Integrated Engineering and Design

Plant projects involve huge amounts of data from both the engineering and design phases across all plant disciplines. This data evolves during a lengthy workflow that requires the participation of many parties. To succeed, you must have good tools for generating, coordinating and managing this complex data flow.

AVEVA Plant is composed of a set of integrated applications which allow engineers and designers on multiple sites to concurrently create, control and manage change to plant engineering and design data as a project is developed in the most productive and risk-free way.

Within the Integrated Engineering and Design solution there are three main categories: Engineer – Design – Manage.

Products in AVEVA Engineer create schematics, diagrams, datasheets, engineering lists and indexes. The AVEVA Design products create 3D models for detailed design and produce all associated deliverables. And AVEVA’s Manage products enable global work share, clash management and design review.

AVEVA Plant – Key Features

- The integration of engineering and 3D design data ensures the management of inconsistencies within engineering and design data.
- Flexibility in the choice of engineering authoring tools such as P&ID applications.
- The fastest, most productive and risk-free tool set to design, build and revamp plant of any size and complexity.
- Concurrent global project execution.
- Tight integration with AVEVA’s Digital Information Hub strategy to support project and plant lifecycles.
Minimise time and cost for new plant projects
The integration of engineering and design applications in AVEVA Plant allows the maximum level of parallel working between the individual applications.

This is achieved in a managed and controlled way, so that workflows and change management processes are applied across the complete project development process to create error-free deliverables. This leads to an efficient overall project, with a minimum of elapsed time and cost.

Cost-effective plant upgrades and life extensions
With the Integrated Engineering and Design functions of AVEVA Plant you can carry out upgrades and life extension projects with the highest level of parallel working between applications creating the most cost-effective projects.

New level of efficiency
AVEVA Plant is a technological breakthrough to a new level of efficiency in plant design. The AVEVA Plant technology makes possible the fully-integrated, concurrent development of engineering and 3D design data. This allows engineers and designers working together on a plant design project to deliver savings of up to 30% compared to alternative solutions.

‘A breakthrough to a new level of efficiency for Engineering & Design – savings of up to 30%...’
AVEVA Global
AVEVA Global allows users at multiple sites to work online together on the same project. It controls the release of data to each site and ensures that all users have access to the latest approved data.

AVEVA Review
AVEVA Review is a powerful 3D visualisation tool for large, complex, plant models. With features such as walk-through, animation, and high-quality photo-realistic images, Review lets you analyse designs and communicate complex ideas.

AVEVA ReviewShare
AVEVA ReviewShare brings together 3D design review, mark-up and collaboration using 3D models, embedded screenshots, document views and hyperlinks, into one application. ReviewShare works with a large number of 3D data formats, not just AVEVA Plant, with server-based streaming technology or desktop model files.

AVEVA Clash Manager
AVEVA Clash Manager provides comprehensive recording, trend analysis, identification, management and resolution of clashes through an approval mechanism. The application reports on clashes, status, history and the discipline allocated to resolve each clash. This enables the administrator or user to prioritise, control and monitor the work involved in the resolution of all clashes.

AVEVA Instrumentation
AVEVA Instrumentation is a software suite for creating and maintaining instrumentation and control engineering data in existing projects, and as new projects are developed. AVEVA Instrumentation provides a wide range of flexible automated inputs and outputs, which generate major cost savings.

AVEVA Electrical
AVEVA Electrical is a software suite for creating and maintaining electrical equipment and cabling data in existing projects, and as new projects are developed. Considerable cost savings are made possible through a wide range of flexible automated inputs and outputs.

AVEVA Schematic 3D Integrator
AVEVA Schematic 3D Integrator is an application which integrates P&IDs with the PDMS or Outfitting 3D model. It can be used to build 3D models from schematic data, or to associate an existing 3D model with a P&ID, so that inconsistencies can be highlighted and corrected. It also gives PDMS or Outfitting users access to all schematic and engineering data, enabling the execution of comparisons and the creation of complex reports and drawings containing a mix of 3D, schematic and engineering data.

AVEVA Engineering
AVEVA Engineering is an application enabling multi-discipline engineering teams to concurrently create and maintain engineering objects and their attributes as a project is developed. The application can also be used to import and consolidate ISO 15926-format P&IDs from AVEVA P&ID and third-party authoring systems into the AVEVA model database.

AVEVA Diagrams
AVEVA Diagrams is an intelligent diagramming system for P&IDs, ducting schematics and similar diagrams. It enables the continuous saving of diagram objects directly to the AVEVA model database, as a diagram is created or modified. This technology delivers exceptional integration with AVEVA’s 3D design products via shared administration, report generation and data management capabilities.

AVEVA P&ID
AVEVA P&ID is a P&ID drafting application which allows the user to work via the familiar AutoCAD drafting system. The application creates intelligent, project-wide engineering data as the P&ID is drafted, enabling a wide range of reports to be generated. ISO 15926 outputs allow the drawings and data to be loaded into the AVEVA model database.

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AVEVA PDMS
AVEVA PDMS is a datacentric, multi-disciplinary design environment for the 3D design of process plant. It has modules for the design of equipment, piping, ducting, structure and cable trays. Modelling is carried out using customer-defined catalogues and specifications, in a full colour shaded 3D environment, with the support of tools that ensure a clash-free design. A wide range of drawings, pipe isometrics, reports and Material Take Offs can be produced automatically from the model.

AVEVA Multi-Discipline Supports
AVEVA Multi-Discipline Supports is an application for the detailed design, Material Take Off and automated drawing production of supports for piping, ducting and cable trays. A comprehensive range of standards are included, in addition to user-defined catalogue customisation.

AVEVA Cable Design
AVEVA Cable Design is an application for the design of cables, including their routing in cableways and through penetrations. Output includes cable schedules with routes, cable-cutting lists, and Material Take Off.

AVEVA Mechanical Equipment Interface
AVEVA Mechanical Equipment Interface employs the robust and widely-supported STEP AP203 protocol to allow AVEVA PDMS users to import 3D models of equipment items created in Mechanical CAD (MCAD) systems. Imported models behave exactly like native PDMS objects; they may be replicated as required, have attributes and connection points associated with them, and so on.

AVEVA Laser Model Interface
AVEVA Laser Model Interface adds to PDMS a tool for working with as-built 3D model data by interfacing with point cloud data from laser scanning systems.

AVEVA Pipe Stress Interface
AVEVA Pipe Stress Interface provides a two-way interface for the exchange of information between PDMS and the CAESAR II pipe stress system. Piping designers and stress engineers can exchange design and stress information seamlessly, without duplicating information.

AVEVA Nuclear Concrete Design
AVEVA Nuclear Concrete Design is a highly productive, specialised product for the design and modification of the complex concrete structures found in nuclear power plants.

AVEVA Nuclear Room Manager
AVEVA Nuclear Room Manager is a specialist application for managing nuclear power plant design on a per Room, Volume or Area basis. Accurate, up-to-date Material Take Offs and inventories can then be automatically produced on an individual Room basis or for any given combination of Rooms that equate to a Construction or Erection area.

AVEVA Laser Modeller
AVEVA Laser Modeller is a solution for rapidly and cost-effectively transforming laser scan data into intelligent, as-built 3D plant models. Compatible with laser data from leading vendors, Laser Modeller automates most aspects of the modelling process, producing a fully validated AVEVA PDMS 3D model, at a fraction of the time and cost of conventional techniques.

AVEVA ISOMET
AVEVA ISOMET is an application which supports the continuous maintenance of piping in a plant. All aspects of piping are handled, from Catalogue and Specification management, to the creation of inspection isometrics, and isometrics for replacement pipes, including production information for manufacture and assembly.
Plant industry projects are typically characterised by the following features:

- one of a kind, or very short series
- short time for design and selection of equipment and materials
- no time or money for a prototype
- construction normally starts before design is finished
- project execution is spread around many companies globally
- a huge variety of applications are deployed, and selection is often influenced by the client.

AVEVA has a unique technology, spanning four decades of continual development, which is designed especially for this type of project. Our approach has been proven on projects ranging from the smallest upgrades to the largest and most complex new installations.

At the centre of the AVEVA approach is the use of ‘objects’ to represent real parts of the plant such as a valve, a pipe or a pump. An object will have many types of data associated with it, such as schematic data, engineering property data, and 3D model data.

In the engineering phase, engineering properties and connectivity of the object are created. In the design phase, the geometry of the object is created as part of a complete layout of the plant and stored in the model database. In most projects, these two phases are carried out, to a large extent, in parallel. AVEVA Plant allows our customers to seamlessly manage the consistency of data between these two overlapping phases as the project is developed.

Managing project data at the object level reduces costs and shortens project times, because the controlled release of object data supports the maximum level of parallel or concurrent working in the project.

Concurrent working in a project
AVEVA’s integrated engineering and design makes it possible to support processes such as Change Highlighting to identify and manage different versions of information. You can also work across disciplines at any point in the project with a powerful Compare & Update capability that synchronises data between disciplines. This native integration between applications ensures you are fully aware of the state of information, with clear distinctions between issued work and work in progress.
Solutions that address the needs of both Owner Operator and EPC

The AVEVA Plant portfolio is tightly integrated with AVEVA’s larger Digital Information Hub strategy. The hub provides a common environment for the sharing of data and documents and enables collaborative and highly efficient processes such as project handover between EPCs and Owner Operators.

- AVEVA supplies Owner Operators with an Operations Integrity Management solution. This delivers real cost savings in support of plant operations, maintenance and revamps, through the effective capture, validation, control and change management of plant data and documents.
- AVEVA saves time and money during an EPC project with an Integrated Project Execution solution. This is achieved by effectively creating, controlling and managing change to the plant data and documents as the project develops through the engineering, procurement and construction stages.

Strengths of the Digital Information Hub

- A centralised, secure store of information and its associated relationships
- A resource to control information standards, access and modification
- A user-friendly environment for collaboration, search, 2D and 3D visualisation and contextualisation
- A management tool for modelling business processes
- A single source of trusted information for AVEVA applications and third-party products
- An information-centric architecture that supports consistent, accurate and dynamic reporting

Benefits of the Digital Information Hub

- Quality – Reduce rework caused by inaccurate information
- Validation – Resolve information inconsistencies and gaps
- Time – Reduce time to production startup
- Cost – Reduce the cost of ongoing operations, unplanned rework and downtime
- Risk – Mitigate operational and safety risks through improved decision support