About

Since its first release in 1993, WellCAD™ has become a valuable tool for thousands of geoscientists dealing with borehole data.

WellCAD™ handles the entire data loading, log editing, analysis and presentation workflow for drilling, wellsite, core and logging data - independent of the industry sector.

The modular architecture of WellCAD™ allows users to easily activate advanced modules to build a package tailored to their requirements and make it an attractive solution for small scale companies as well as large multinational corporations.
Product Overview

Rich graphical display

- Fully graphical driven standard Windows* software
- Real-time data display generated from the depth / time based information held in the data repository
- Display of curves, patterns, symbols, text, formation markers, image data, photographs,…
- Comprehensive sets of formatting styles (point, bar, curve style, color, thickness, fonts, shading,…)
- Editor for custom symbols, patterns, header & trailer design
- 3D borehole display

Comprehensive interpretation tools

- Common data processing tools: resampling, filtering, single-, block- or multi-curve statistics, equation editor,…
- Dedicated workspaces for Image & Structure Interpretation, FWS, NMR, Casing Integrity, Core Description, Multi Well Correlation,…
- Cross plotting workspace and chart log
- Application programming interface for batch processing scripts or advanced algorithm development

Intuitive data management

- Choose from 28 different data container types to host single point, interval or array data
- Intuitive user interface to manage data and properties
- Powerful templates for automatic plot formatting
- Alias tables for mnemonic management and standardization
- Automatic audit trail of changes made to each data container

Mobility

- WellCAD™ works on PCs, laptops and tablets with Windows OS *
- Completely portable through hardlock protection or server license borrowing
- Does not require a connection to a database system

Global support team

- A Support & Maintenance plan guarantees free support from the WellCAD team globally and an up-to-date software version.

* 32 and 64bit compatible, supported by Windows
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WellCAD™ Basic</strong></td>
<td>Main Application</td>
<td>The Basic version provides the foundation for data management, analysis and presentation. It allows creation of comprehensive log displays and is the base to activate Expert Modules</td>
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<tr>
<td><strong>CoreCAD™</strong></td>
<td>Add-on</td>
<td>Interactive digital core description workspace for WellCAD™ including Core Image Cropper and Core Shifter workspaces.</td>
</tr>
<tr>
<td><strong>ISI (Image &amp; Structure Interpretation) Workspace</strong></td>
<td>Add-on</td>
<td>Single, built-for purpose workspace combining manual and automated structure picking, classification, correction and interpretation into a single workflow</td>
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<tr>
<td><strong>FWS</strong></td>
<td>Add-on</td>
<td>A collection of built for purpose processes and a velocity Analysis workspace for the processing of Full Waveform Sonic data</td>
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<tr>
<td><strong>NMR</strong></td>
<td>Add-on</td>
<td>Collection of processes and a workspace for interactive T2 cutoff fitting to determine total porosity, fluid volumes, permeability and dry matrix density</td>
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<tr>
<td><strong>Casing Integrity</strong></td>
<td>Add-on</td>
<td>This module opens the door to professional cased hole data interpretation and adds a workspace and processing options for multi-finger caliper and ultrasonic televiewer</td>
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<tr>
<td><strong>Deviation</strong></td>
<td>Add-on</td>
<td>A collection of 2D and 3D display options for survey data</td>
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<tr>
<td><strong>Automation</strong></td>
<td>Add-on</td>
<td>An application programming interface allowing you to use objects, methods and properties exposed by WellCAD™ in VBS, VBA, VC++, C# and Python program code</td>
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<tr>
<td><strong>MultiWell</strong></td>
<td>Add-on</td>
<td>2D multi-well correlation add-on seamlessly integrated into WellCAD™</td>
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<tr>
<td><strong>Browser</strong></td>
<td>Add-on</td>
<td>Connects WellCAD™ to your LoggerSuite data acquisition software to receive the currently logged data in real time</td>
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<tr>
<td><strong>Reader</strong></td>
<td>Viewer</td>
<td>Free data viewer for WellCAD™ files with ability to change depth scale and to print continuous or page-by-page</td>
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</table>
Applications

Wellsite Logs
Well Planning, Operations, Progress & Completion Logs

Well Operations Log

- Depth / Time based data
- LWD / MWD data
- Lithology log / Mudlog
- Stratigraphy
- Operational symbols (casing, coring, ...)
- Directional data
- Well diagrams
- ... and more
Core Description

Clastic Core Log

Core Logs for the Oil & Gas and Mining industry

Core Image Cropper

Core Description Workspace

- Lithology, structures and descriptions
- Grain size, porosity, texture
- Core photographs
- Core analysis data
- Digitization of paper core logs
- Core / Log depth matching
- … and more

Core Shifter Workspace

Core depth matching and re-orientation
Log Analysis

Net-sand Analysis from FMI

- Scalar and array data editing
- Cross plotting
- Single- and multi-curve statistics
- Interval statistics
- Custom equations editor
- Application programming interface for advanced algorithms
- … and more
Planar, linear and free hand structure picking
Computer assisted and manual picking
Apparent and corrected picks
Custom pick classification
Polar projection diagrams
Rose and vector plots
Structure interval statistics
... and more
Composite Plots

Composite Plot: Oil & Gas

Composite Plot: Coal Mining

Composite Plot: Wellsite
Well Integrity

Acoustic Televiewer Well Integrity Plot

- MFC, CBL and ultrasonic imager data handling
- Array data editing, filtering, centralization, recalibration
- 2D and 3D representation of data
- Fluid velocity estimation, acoustic caliper and casing thickness determination
- Cement bond evaluation
- … and more

CBL Plot

Well Integrity 3D View
Data presentation

- Display of curves, patterns (e.g. lithology), symbols (e.g. fossils), text, formation marker, hierarchical stratigraphic columns, image data (e.g. FMI, ATV, OTV), photographs, operational symbols (e.g. DSTs, RFTs, Mud Data, Survey Data, etc.), ...

- An unlimited number of data containers, of which 28 different types exist to host single point (continuous and discontinuous), interval or array data, can be freely positioned on the workspace and combined for complex WYSIWYG plot formatting

- Audit trail for each data container and processing step (i.e. Log History)

- No restriction to number of tracks or number of curves to be plotted or superimposed

- Comprehensive sets of formatting styles are available for each data container type – pen type, pen thickness, pen colour, fonts, shading, curve style (e.g. point-to-point, step or bar) and many more

- Scale and appearance of vertical grids can be customized using individual classification schemes (e.g. Wentworth scale, Phi scale)

- Depth may be referenced to MD, TVD, TVDSS or any other depth (or date & time) system due to capabilities of non linear depth matching. Support of depth and elevation display

- Libraries of customisable and scaleable patterns and symbols (e.g. lithology, physical structures, fossils, pore types, ...) are provided. The freely distributed LithCAD application allows design and import of new patterns and symbols
Data management

- Data Formats – Import (LIS, DLIS, LAS, ASCII, EXCEL, WITSML, JPEG, AGS,...)
- Data Formats – Export (LIS, DLIS, LAS, ASCII, CGM, JPEG, EXCEL, Petrel compatible ASCII,...)

Multiple depth management

WellCAD™ provides a multiple depth management system (date/time, depth, TVD,...). The depth matching tool allows you to fine tune your data (e.g. calibrate core description data to the wireline logs). All correlations will be saved in a new depth log helping you to assess the match.
Data interpretation

• Cross plotting workspace (up to 4 components, clustering, overlay and regression options)
• Chart log for cross plots, ternary diagrams and histograms as part of the report
• Workspace for dip data (rose, polar projection, walkout and woodcock diagrams)
• Tracking and statistic bars for interactive determination of statistical information
• Interval and multi-log statistics
• Interactive input and editing of data (in spreadsheet editor and graphic layout)
• Sophisticated annotation options including operational symbols for wellsite geologists
Data processing

Common processes

- Filter, resampling and data interpolation options
- Custom equation editor
- Zonation

Annotations and operational symbols

Annotations (arrows, text or bitmap callouts,…) and a large number of specific operational symbols (oil & gas shows, sidewall cores, RFT/MDT/pressure test, casing data,…) can be added to the graphical report by drag & drop or using the annotation editor. All annotations and operational symbols have real data assigned to it and can be imported or exported.
CoreCAD™ is an interactive digital core description add on module for WellCAD™. Developed by and for geologists, the software offers a dedicated workspace with zoom & snap options, workflow templates, and fast data entry. These tools will allow the geologist to input core descriptions faster and convert them directly into digital format.

As soon as data is inserted into the CoreCAD™ workspace the underlying WellCAD™ composite log chart and its final layout is updated in real time.

CoreCAD™ allows the setting up of customised workflow schemes and layout templates in order to handle clastic, carbonate and outcrop descriptions.

- Allows easy and efficient digital and graphical description of cores
- All parameters described graphically are stored as real digital data – ready to export
- Multiple depth system management
- Use the integrated core image cropper or import core photographs.
- Import hand drafted core descriptions, digitise the data or integrate them into composite log charts
- Fully customisable system for easy and quick creation of all core description data types from biostratigraphy, to diagenetic minerals & depositional subenvironment
- Close the gap between core and log data by using the Core Shifter allowing an iterative interval based depth matching.
Core Description Workspace - CoreCAD

The revised Digital Core Description add-on comes with a new innovative workspace allowing the generation of visually attractive core descriptions (with the look of hand-drawn core sheets) and the acquisition of detailed digital data valuable for petrophysical analysis and reservoir modeling.

The new CoreCAD provides an intuitive and easy to use graphical user interface (GUI) to navigate between core runs and data columns, acquire data by free-hand drawing or interval based data capture and offers the unrivalled flexibility to import, add and export additional data.

Being fully integrated into the WellCAD platform the user has access to all functionalities like Core Image Cropper, Cross Plotting, Color Classification and many more analysis features.

- Innovative and intuitive workspace for core, outcrop and sample logging
- Graphical logging and simultaneous data digitization
- Detailed digital core data is available in each individual data column
- Visually attractive graphical reports.
- Flexible in layout, data organization and logging preference (e.g. free hand or interval based)
- Easy import of additional data columns or generation from Log Templates

CoreCAD Workspace with Navigation bar (left), Data Acquisition view (center) and Log Edition bar (right); simultaneous creation of visually attractive graphical report (far right)

Log column-by-column or drag a reference interval, enter the desired data or paste for example an entire sedimentary facies, Visually attractive, easy to log, readily available digital data

- Support of multiple depth reference systems (MD, Core Depth, TVD, …)
- Full integration in WellCAD allowing seamless combination with wireline, image and laboratory data
- Generation of PDF and standard graphical file formats
- Comprehensive data export options for integration of the data into other software
The Image & Structure Interpretation (ISI) module combines manual & computer assisted structure picking tools, classification, correction, sophisticated data visualization and a logical workflow into a powerful, built for purpose processing an interpretation platform.

A sophisticated computer assisted picking algorithm developed by The Centre for Exploration Targeting at The University of Western Australia* assists in picking structures.

Any number of planar features can be interactively or automatically picked recording azimuth, dip and aperture. Each pick can be described and categorized using customizable attribute classes (ToadCAD). Picks can be displayed as sinusoid, tadpole or stick plot. Picking of linear features (e.g. breakouts, tensile fractures) or tracing features with a free hand tool is also possible.

A fully interactive dips workspace with polar, rose and vector plots and the Polar & Rose log for the graphical report complete the data interpretation workflow.
Supported Image Data

Borehole image data from a variety of sources including ATV, OTV, Electrical Imagers (e.g. FMI, STAR, QGEO, …), Core Scans (CT, optical) and LWD are supported.

Data processing

A large number of pre- and post-processing options are available for image data and structural picks:

- Bad trace interpolation
- Dead sensor correction
- Image normalization
- Despiking filter
- Image centralization
- Brightness and contrast adjustment
- and more …
- Apparent to true azimuth and dip correction
- Residual dip analysis
- RQD estimation
- Determination of fracture height
- Color classification
- Extraction of color components (RGB, HSV, …)
- Structure reorientation (e.g core picks)
Data can be displayed in the graphical report as an image (user definable color palette), as curves (shifted or stacked) or as 3D cylinder display (virtual core). Data can be analyzed in 3D using the integrated 3D borehole view (ideal to visualise breakouts, well deformation, pipe corrosion). Data can be oriented to North or Highside, or rotated by a user defined input (magnetic North to true North correction).
The Casing Integrity Module combines processing algorithms dedicated to cased hole data and a workspace to analyze pipe sections with comprehensive data visualization tools.

- Log editing, depth matching, splicing and merging
- Corrections for drift, dead sensor, decentralization, conditional corrections and more
- Workflows for ultrasonic travel time to radius/diameter conversion
- Automatic pipe detection, interactive joint editing, graphical data presentation and joint analysis table
- Computation of more than 35 different statistical parameters derived per pipe section or at each sample point
- Seamless integration with other downhole data
- Binary, ASCII and graphic export (WCL, LIS, DLIS, LAS, CSV, XLS(X), JPG, PNG, TIF, PDF, …)
- Free data viewer “WellCAD Reader”
Data Processing

The user can choose from a number of processes to be applied to Full Waveform data traces coming from a single or multiple receivers.

- Trace filtering and stacking options
- First Arrival Picking
- Frequency Spectrum
- Integrated Traveltime
- Extract Window Amplitude
- Reflected Tube Wave Analysis
- and more …

Velocity Analysis Workspace

This new workspace keeps the user in control of the Velocity Analysis process through dynamically linked diagrams and immediate result feedback. The waveform slowness can be picked correctly and in a time efficient and user-friendly manner.

Rock Mechanical Parameters

Sonic logs are widely used to provide formation porosity/permeability and mechanical properties. If P-wave slowness, S-wave slowness and Density are known, the add-on module allows computation of a series of Rock Mechanical Properties (Poisson ratio, Vp/Vs Ratio, Shear modulus, Young’s modulus, Bulk modulus and Bulk compressibility).

Cement Bond Logging

The FWS add-on module provides different algorithms to derive waveform amplitudes from fixed and floating gates. Calibrations can be applied to generate a Cement Bond Log. RBT tool data processing is supported.
The NMR module provides industry standard presentation tools for T2 distribution data and delivers a set of processes to derive:

- total porosity
- fluid volumes
- dry matrix density
- permeability (Timur Coates and SDR)
- fluid volumes
- dry matrix density

It also provides a dedicated workspace where the user has the possibility to examine T2 data in details and add T2 cutoffs. These can be adjusted for each imported or interactively defined zone.

A special upgrade for the NMR Data Processing module is available to post-process data from the latest Borehole Magnetic Resonance (BMR) tool released by NMR Services Australia.
The module includes various 2D and 3D display options for deviation data from classical bull’s eye, projection and closure 2D views to 3D cubic and cylindrical displays. Each view comes with its own settings and options. Multiple well paths and target layers can be displayed.

The methods for computing x,y,z coordinates from borehole azimuth and tilt are provided in the WellCAD™ basic process (classic tangential, balance tangential, radius of curvature, minimum curvature).
Automate data loading and data processing tasks by writing simple Visual Basic Scripts (VBS) using a text editor or develop new processing algorithms in VC++ and use WellCAD™ as your data visualization and reporting platform.

WellCAD™ exposes objects, methods and properties to industry standard programming languages such as VBS, VBA, VB, VC++, C# and Python.

Objects such as the WellCAD™ application, a borehole document, logs or headers allow access to methods and properties.

Exposed methods include file import and export, printing, common processes (filter interpolate, resample,…) or processes from add-on modules.

Properties allow access to log data and display settings.

The ODBC connection module allows WellCAD to pull data from and push data to an ODBC compatible database. Database administrators or skilled users have to write their own SQL scripts to control the data transfer between WellCAD and the database. A collection of WellCAD specific properties and methods is supported by the module. These can be used in the SQL scripts to fill logs and borehole document headers with data while adapting to the users own database model.
The MultiWell add-on module for WellCAD™ has been developed as an easy to use and simple to maintain tool to correlate multiple wells in 2D without the need for a powerful workstation or connection to a database server. The field document architecture does not require a database and therefore provides more flexibility when combining field and office work.

Each well in a field document corresponds to a single WCL file (WellCAD™ borehole document). In this way each individual data channel contained in the repository is easily accessible.
LoggerSuite comes with ALT/Mount Sopris Instruments data acquisition systems ALTLogger, MATRIX, BBox, Scout, OPAL and provides a sophisticated GUI to control your logging tools and the logging operation.

In this example, the operator is able to monitor the realtime scrolling log, view any or all other logs while monitoring all the log outputs, including depth. Optionally raw sensor data may be displayed. Comparison with main & repeat section, scrolling and adding annotations while data acquisition continues.

Log curve scale and other presentation parameters may be adjusted while logging.

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