HydroExpert
FEATURE MATRIX

Version 1.2 (2013-01-13)

	STANDARD	CUSTOM
DECISION SUPPORT SYSTEM – HYDROEXPERT		
New in 2013! Google Maps® and Google Earth® integration. Now plants, reservoirs and control stations can be seen on Maps tab with Google Maps integration. Also, HydroData XP can export hydro elements to be seen on Google Earth.	√	√
New in 2013! Hydro Constraints Module with mathematical syntax analyzer that permits constraints to be simulated and tested into studies.	√	√
New in 2013! Improved. Full functional mobile version to run with external storage devices as pen drives and SD cards.	√	√
New in 2013! Improved. Windows XP®, Windows 2000®, Windows Vista®, Windows 7® and Windows 8® compatibility. The graphic interface adapts to the Windows visual resources. Windows Vista and Windows 7 look and feel, including Windows Aero glassing effects.	√	√
New in 2013! Improved. Internationalization feature extended to new modules. Two languages are available: English and Portuguese.	√	√
New in 2013! Performance! Several code improvements produced an interface 2 times faster than earlier versions.	√	√
New in 2013! New “Reload data” option in “Hydro elements” list view to synchronize data stored into study files with the HydroData XP database.	√	√
Database connection interfaces for Firebird® and SQL Server® DBMS compatibility.	√	√
User profiles and account manager. The support decision system allows different users to use the interface, keeping isolated their preferences and studies.	√	√
Security Improvement. On Windows and SQL Server®, administrators can active the *Security Service Provider Interface* (SSPI) which uses the Windows logon to access SQL Server servers.	√	√
Study oriented decision support system. Studies input and output data are stored in documented ASCII files. Data can be imported from remote DBMS and locally saved into text files. To backup or to transfer studies between computers is just a matter of copying and saving files.	√	√
Any study’s text files can be seen, edited, saved and printed directly from HydroExpert interface with syntax highlight. Study files editing allows the user to change data not shown in the interface.	√	√

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All study files are saved into a specific directory using the user login name.	√	√
Study manager based on nodes into a tree-view component. The user can easily create, edit, run, store and delete studies into a tree-view graphic manager.	√	√
New in 2013! Improved. Studies can be sent via e-mail. Configuration options for SMTP login and security. The study's files are automatically available as attachments. Other files attachments can be chosen by the user (menu "Study > Send by Email...").	√	√
Studies can be saved into a directory selected by the user (menu "Study > Save to Directory...").	√	√
Thread-safe run operation. When the user run a model (study), the HydroExpert creates a thread on Windows to optimize the computational time costs and to avoid "frozen" interfaces.	√	√
Hydro elements (plants, reservoirs and control points) are managed by a navigator based on nodes into a tree-view component. The user can easily choose a hydro element for input data or output results analysis into a tree-view graphic manager.	√	√
Built-in exception/failure management system for security of user's activities. At any exception, the user interacts with a friendly dialog to contact the HydroByte Software development team and to report a bug. Failure log is also generated.	√	√
Interface with enabled/disabled edition options.	√	√
Interface with dimensions persistence between executions.	√	√
View any chart in secondary windows.	√	√
New in 2013! Improved. Any chart in the interface is drag-and-drop enabled for comparison of series data. New auto-select color resource for data series of the same kind.	√	√
Export chart data to spreadsheets (MS Excel®) or to image formats (PNG, JPG, GIF).	√	√
Any grid into the graphic interface can be easily exported to other formats: ASCII text, CSV format, MS Excel®, MS Word®, HTML and XML.	√	√
New "Export Grid" to export any grid content to several formats.	√	√
New in 2013! Improved. Configurable time intervals: half-hour, hour, day, week or month. New behavior for horizons with weekly time steps (ISO 8601 compliance).	√	√
Activity log to monitoring system performance. Any user action is recorded into a log file for future activity track and analysis.	√	√
Report builder with options to generate reports of generation scheduling, turbines' unit commitment, user defined actions and graphical reports with charts from "Results" tab.	√	√
Any report can be grouped and exported to PDF.	√	√

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Charts can be zoomed with a particular frame that allows users to see series in pages or in any other time scale.	√	√
Results tab with categorized charts: Flow, Spillage, Generation, Volume, Units, Efficiency and Heads.	√	√
Results can be seen in charts or grids.	√	√
New in 2009! Improved. The procedures of showing grids into Results tab were improved. New performance could be 100 times faster than before (mainly in huge studies).	√	√
New in 2009! Improved. Spillways maximum discharge functions. Display of spill capacity into the Results/Flow tab. Spillage structures can be enabled or disabled into Study Properties dialog.	√	√
Automatic spill for non-controlled spillways.	√	√
Over 120 fixes and improvements since 2007.	√	√
DATABASE - HYDRODATA		
New in 2013! Google Maps® and Google Earth® integration. Now plants, reservoirs and control stations can be seen on Maps tab with Google Maps integration. Maps views are synchronized with HydroData organization, e.g., plants belonging to a hydro basin will be shown on a map. Also, HydroData XP can export hydro elements into KML files to be seen on Google Earth.	√	√
New in 2013! New "Export to Map Formats" to export the HydroData XP database to Keyhole Markup Language (KML) compatible with Google Earth® and GPS Exchange Format (GPX) compatible with points of interest in GPS devices.	√	√
New in 2013! Hydro Constraints Module with mathematical syntax analyzer that permits constraints to be stored into the HydroData XP database and simulated and tested into HydroSim XP studies.	√	√
New in 2013! Improved. Mobile version uses Firebird® to run with external storage devices as pen drives and SD cards.	√	√
New in 2013! New "Pumping plants" and "Small hydropower plants" categories.	√	√
New in 2013! New options to insert or delete hydro elements as hydroelectric plants, reservoirs and control stations into HydroData XP database.	√	√
Firebird® and SQL Server® DBMS compatibility.	√	√
Client-Server infrastructure with TCP/IP.	√	√
Custom versions can import specific operation record from SQL Server® and Informix® DBMS. Can be extended to other users.		√
Custom versions can Import turbine's maintenance scheduling from SQL Server® DBMS. Can be extended to other users.		√

HydroExpert FEATURE MATRIX

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Activity log for the operation data imported from SQL Server® and Informix® DBMS.	√	√
New in 2013! Improved. Brazilian interconnected hydroelectric system (more than 184 reservoirs).	√	√
New in 2013! Improved. Import feature for read data from NEWAVE® Hidr.dat and Vazoes.dat files.	√	√
Import feature for read data from SIPOT® Access® database file.	√	√
Categorized data from hydro plants and reservoirs in tabs.	√	√
Database built-in versioning system.	√	√
New in 2013! Improved. Dababase with edition/changes built-in log.	√	√
3D visualization from turbines' efficiency hill curves and power function.	√	√
Color grid for turbines' efficiency hill curves.	√	√
Post-operation tab for operation's record analysis with HydroSim XP graphic interface.		√
New in 2013! Maps and Constraint (hydro constraint) data tabs.	√	√
Over 60 fixes and improvements since 2007.	√	√
MULTIRESERVOIR SIMULATION – HYDROSIM XP		
New in 2013! Hydro Constraints Module with mathematical syntax analyzer that permits constraints to be stored into the HydroData XP database and simulated and tested into HydroSim XP studies.	√	√
New in 2013! New "Wizards" tab with helpers to the decision-making process. Three wizards available: automatic deplete/replete storage, PDP validation and FASG (COPEL) Algorithm.	√	√
New in 2013! New "Import PDP Data" dialog to import data from PDP format used by the Brazilian ISO (ONS).	√	√
Special data modules to import dynamic data from Duke Energy, CESP, CEMIG and ONS operation databases. Can be extended to other users.		√
Unit generation dispatch. Decisions input can be split into turbines groups or into individual turbines generation.	√	√
Multi-reservoir simulation integrated with HydroData XP database (more than 150 reservoirs available for simulation).	√	√
Non-linear representation of hydroelectric production power function.	√	√
Forebay and tailrace variable water levels using polynomials.	√	√
Turbine efficiency function (hill curves).	√	√
Routing (time delay) between reservoirs.	√	√

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Simulation of reservoirs, powerhouses, deviation structures (channels and tunnels) and control points/stations.	√	√
Procedure to local dispatch of turbines' (unit commitment) using the minimal loss curves principle.	√	√
Simulation with automatic or manual modes. Into automatic mode, some constraints are built-in verified during simulation: minimum release, storage security level and maximum storage level. Into manual mode, user can check how far these constraints would be violated.	√	√
Simulation with automatic rules for storage levels in flood control studies.	√	√
New in 2009! Storage rules for flood control studies use the new feature of maximum spillway discharge functions.	√	√
New in 2009! Improved "HydroSim XP Properties" dialog.	√	√
Decision grid with bookmarks and constraint checking.	√	√
New in 2009! Improved. Import data from other HydroSim XP study.	√	√
New in 2009! Improved. Export generation scheduling and turbines' unit commitment to the ONS's PDP Web format.	√	√
New in 2009! Performance: study with 8 reservoir and one-year horizon with half-hour intervals (140,160 iterative operation nodes) takes just one minute to be simulated.	√	√
Scheduling tab for easy input generation dispatch and analysis.	√	√
New in 2009! Inflow tab with chart visualization and data edition using grids.	√	√
Setup Advance tab for initial storage, security storage, routing and turbines' maintenance scheduling. Storage's setup can be easily done with a scaled rule with three input options: volume in hm^3, usage in % and water level (elevation) in m.	√	√
New in 2009! Spillway characteristic data and maximum discharge functions.	√	√
New in 2009! Storage scaled rules now shows the security range between the maximum operational level and the overall storage level (called *maximorum* in Brazil). Storage usage above 100% are now available.	√	√
Over 80 fixes and improvements since 2007.	√	√

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