

Process Simulation Software: User Interface

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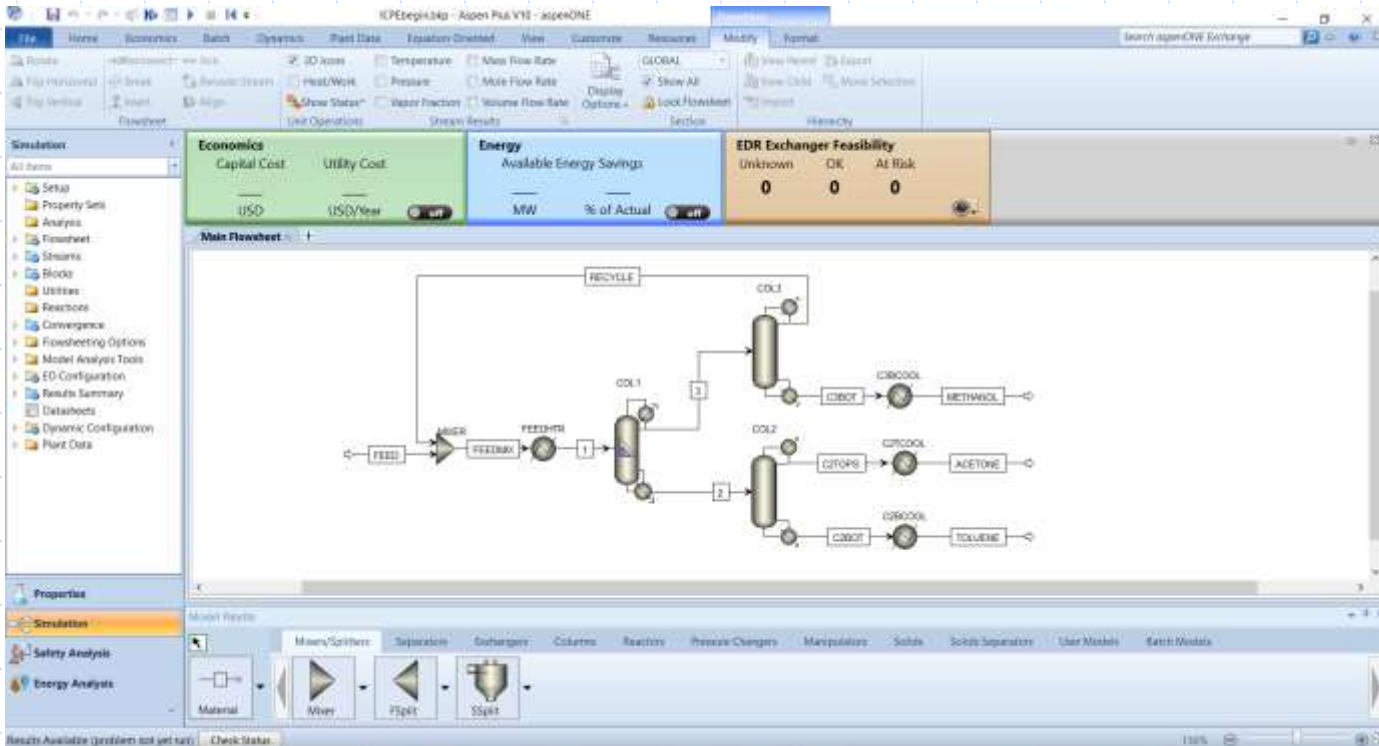
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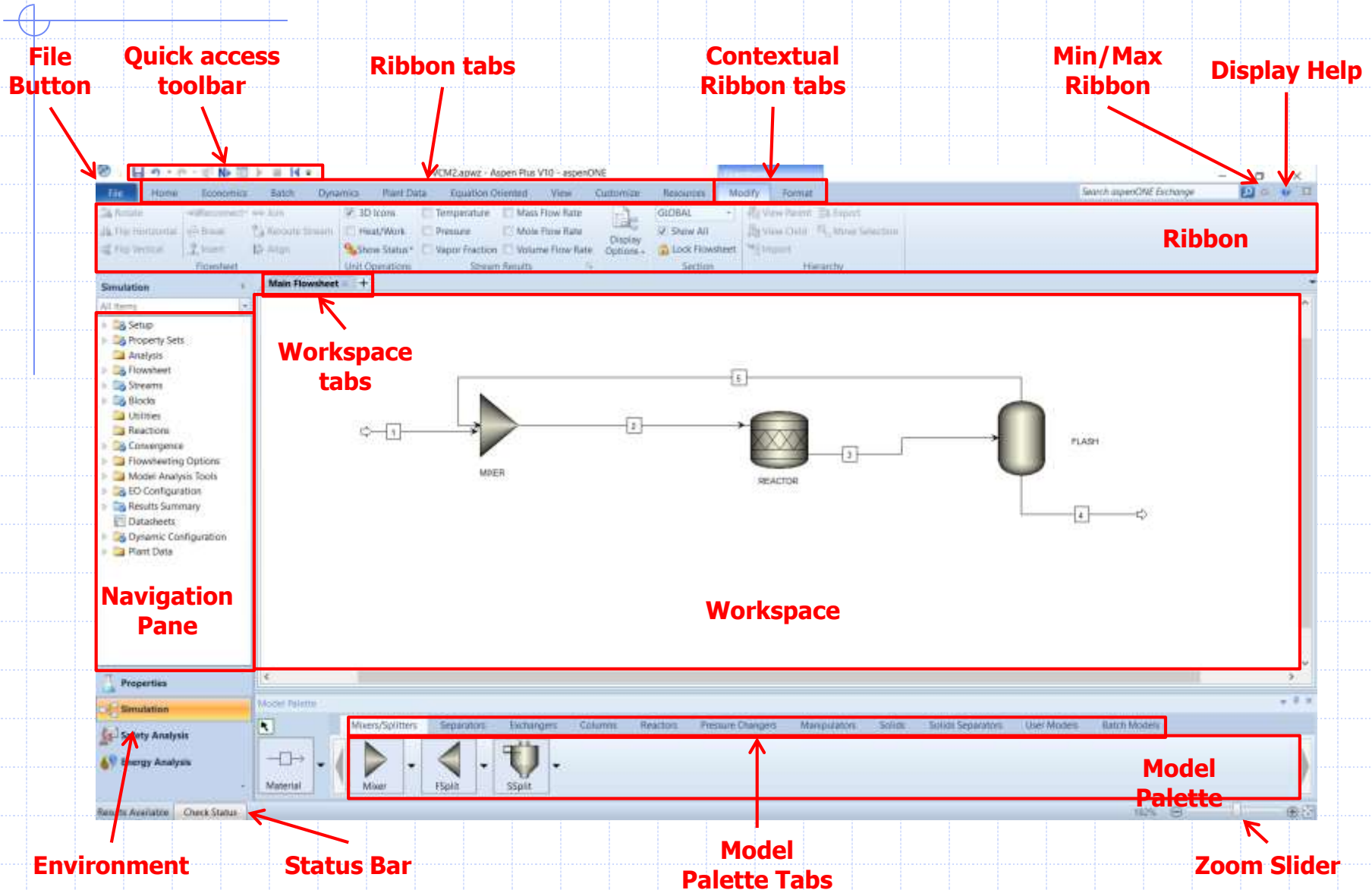
University of Trieste



Aspen Plus



User interface



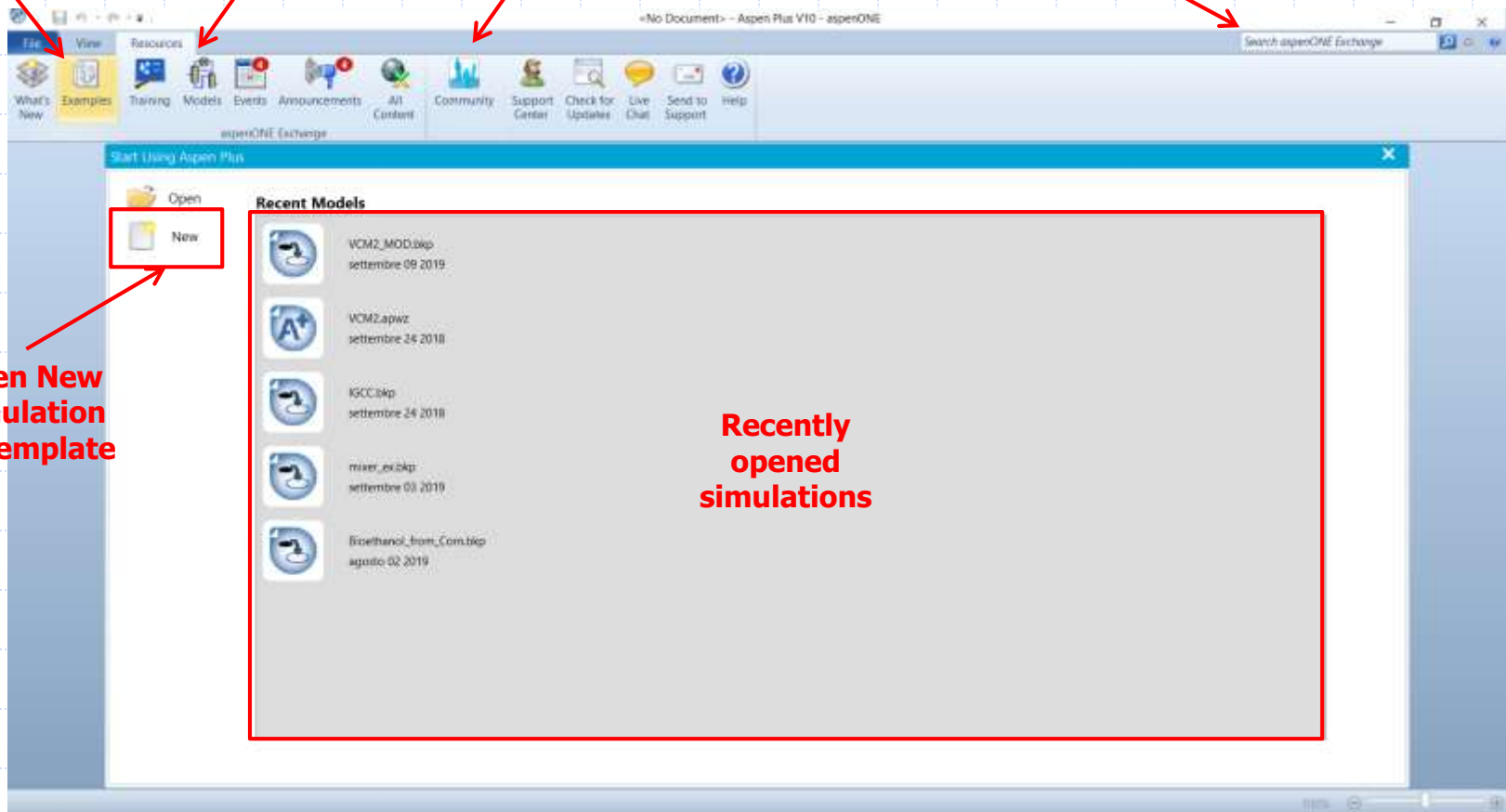
Aspen Plus Start Page

Simulation Examples

AspenONE Exchange

Community

Search in AspenONE Exchange



Open New Simulation or Template

Recently opened simulations

aspenONE Exchange

Search Filters

Search Categories

Preview items before download

Search in AspenONE Exchange

The screenshot shows the AspenONE Exchange web interface. The top navigation bar includes 'File', 'View', 'Resources', and 'Options'. Below this is a 'Browse by category' section with icons for Training, Documentation, Models, Literature, Tools, Events, Announcements, Blogs & Discussions, Learn About, and Related Features. The main content area is titled 'Exchange' and features a search bar, a 'Sort By' dropdown set to 'Relevance', and a 'Request new content' link. On the left, a 'Filters' sidebar is expanded, showing categories like 'Primary Product' (Aspen Plus, Aspen Shell & Tube Exch., etc.), 'Training Type' (Video Tutorials, Webinars, etc.), and 'Organization' (AspenTech). The 'Search Results' section displays several items, each with a thumbnail and a title: 'Distillation Improvement', 'Getting Started with Aspen Simulation Workbook in Aspen Plus V8', 'Welcome to the Training Center', 'Getting Started with Aspen Dynamics V8', and 'Getting Started with Activated Energy Analysis in Aspen Plus'. On the right, there are sections for 'Learn About' (Batch Distillation Modeling, Entropy and Second Law of Thermodynamics, etc.) and 'Related Features' (Batch Process Development, Custom Modeling, etc.). Red arrows point from the text labels to the corresponding elements in the interface: 'Search Filters' points to the sidebar, 'Search Categories' points to the 'Browse by category' icons, 'Preview items before download' points to the search results, and 'Search in AspenONE Exchange' points to the search bar.

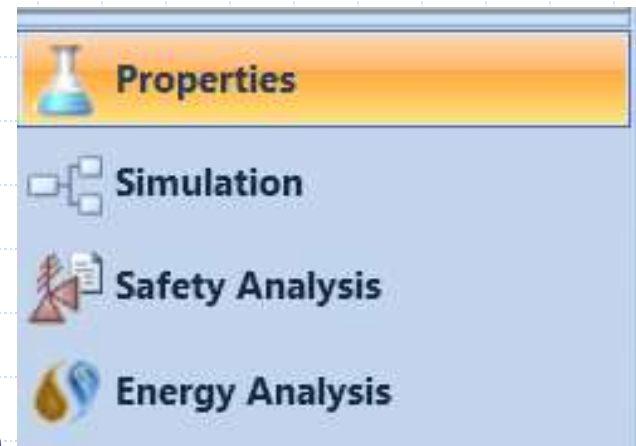
Aspen Plus Environments

◆ Properties Environment

- Define the physical properties
 - ◆ Component selection, generation and characterization
 - ◆ Thermodynamic methods and database
 - ◆ Collect experimental data
 - ◆ Property estimation
 - ◆ Property analysis
 - ◆ Data regression

◆ Simulation Environment

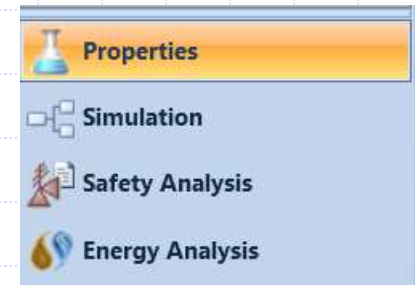
- Used to build and run the process model
 - ◆ Design and create process flowsheet
 - ◆ Perform interactive analysis (sensitivity, design spec.)
 - ◆ Fit models to process or experimental data
 - ◆ Preliminary equipment design, sizing and rating
 - ◆ Economic evaluation of the process design



Aspen Plus Procedure

◆ Properties Environment

- Select the components involved in the chemical process from databanks or generate the components using the specific interface
- Specify the thermodynamic methods suitable for the simulated system
- Collect experimental data
- Property estimation
- Property analysis
- Data regression



◆ Simulation Environment

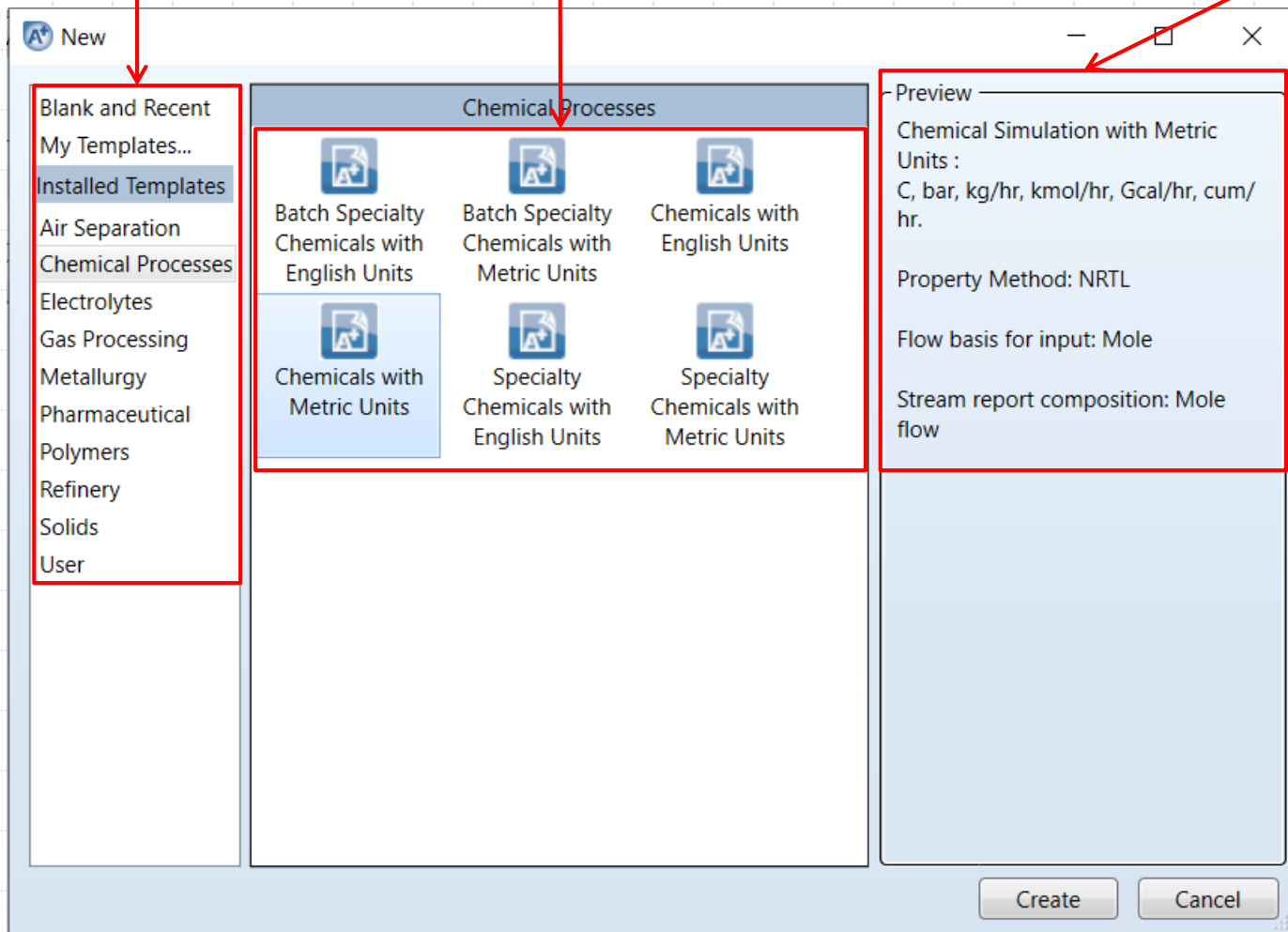
- Select the appropriate blocks to represent the process design
- Create the unit operations connected with streams
- Specify the streams condition, composition and flowrate
- Set the operative conditions of unit operation models
- Define the utilities and cost factor to perform energy and cost analysis

New Simulation

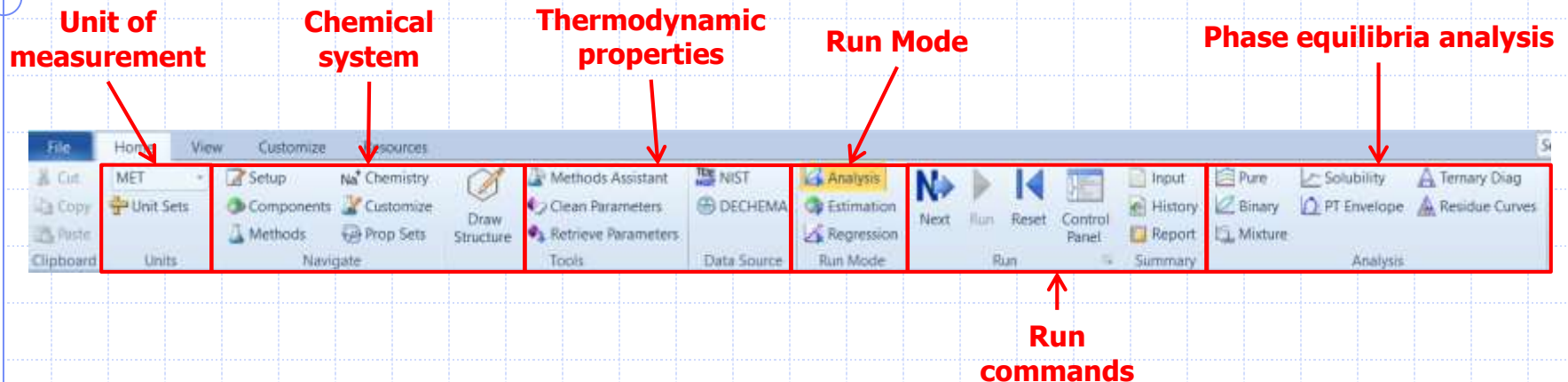
Process types

Templates available for category

Template characteristics



Properties Home Ribbon



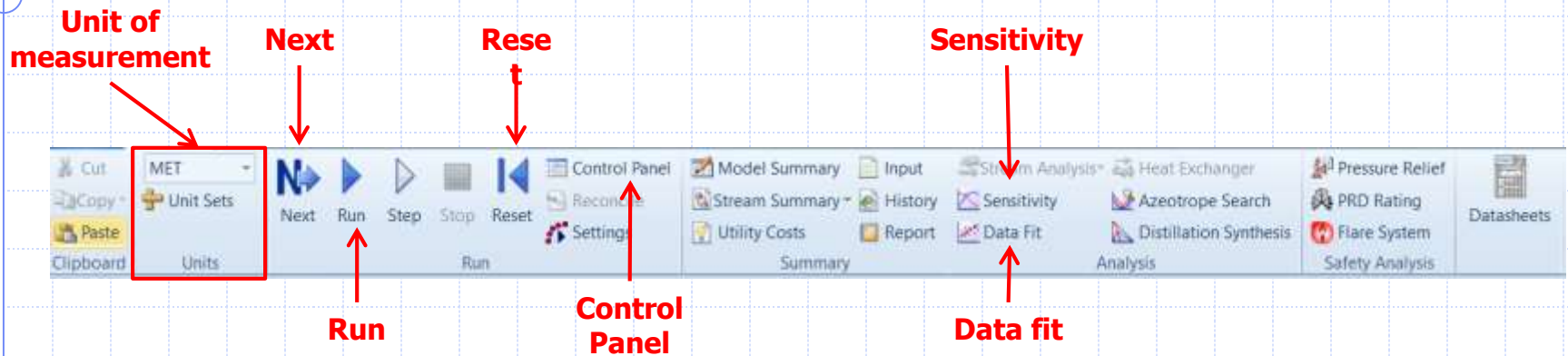
- ◆ Unit of measurement: select the appropriate set of UoM among the available ones or create your own
- ◆ Chemical system: define components involved
- ◆ Thermodynamic prop: set the thermodynamic method and parameters
- ◆ Run mode: specify the target of the simulation
- ◆ Run commands: perform calculations
- ◆ Phase equilibria analysis: perform analysis on thermophysical properties

Properties Navigation Pane

The screenshot shows a tree view of the Properties Navigation Pane. Red boxes highlight specific folders, and red arrows point from these boxes to descriptive text on the right. The highlighted folders and their descriptions are:

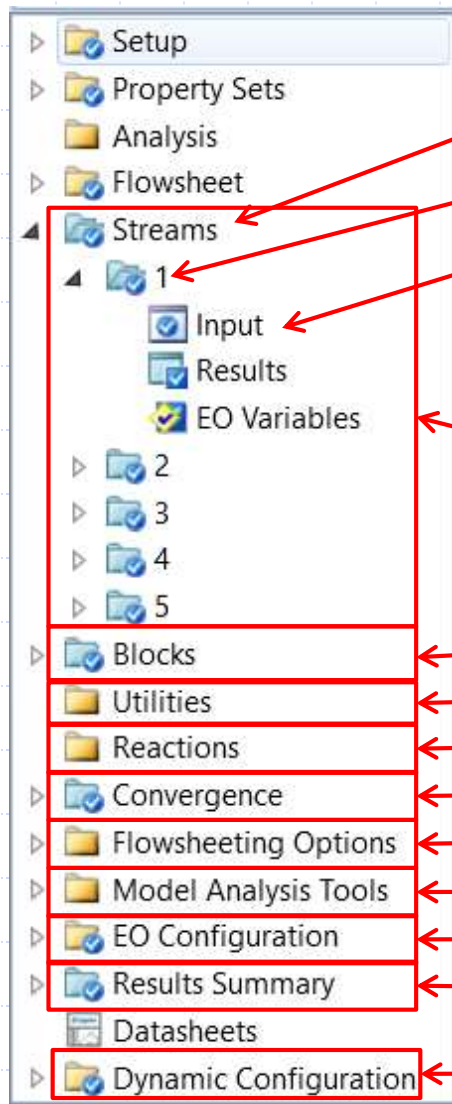
- Setup**: General settings
- Components**: Chemicals introduced in the simulation
- Methods**: Thermodynamic methods
- Specifications**: Thermodynamic method settings
- Parameters**: Properties parameters
- Chemistry**: Chemistry of the system (e.g. electrolytes)
- Estimation**: Properties estimation (e.g. group contribution methods)
- Analysis**: Phase equilibria analysis

Simulation Home Ribbon



- ◆ Unit of measurement: select the appropriate set of UoM among the available ones or create your own
- ◆ Next: move to the next unspecified parameter
- ◆ Run: run the simulation
- ◆ Reset: purge simulation results. Very important when parameters have been modified between different runs
- ◆ Control Panel: shows convergence, warnings, errors and procedures during a run
- ◆ Sensitivity: perform sensitivity analysis
- ◆ Data fit: enable to fit real data to simulation results

Simulation Navigation Pane



Folders: refers to the root items in Nav Pane

Forms: used to enter data and view results

Sheets: can be selected using tabs

Streams list

Unit operations list

Utilities adopted

Reaction introduced

Convergence report & issues

Design Specification & Calculation

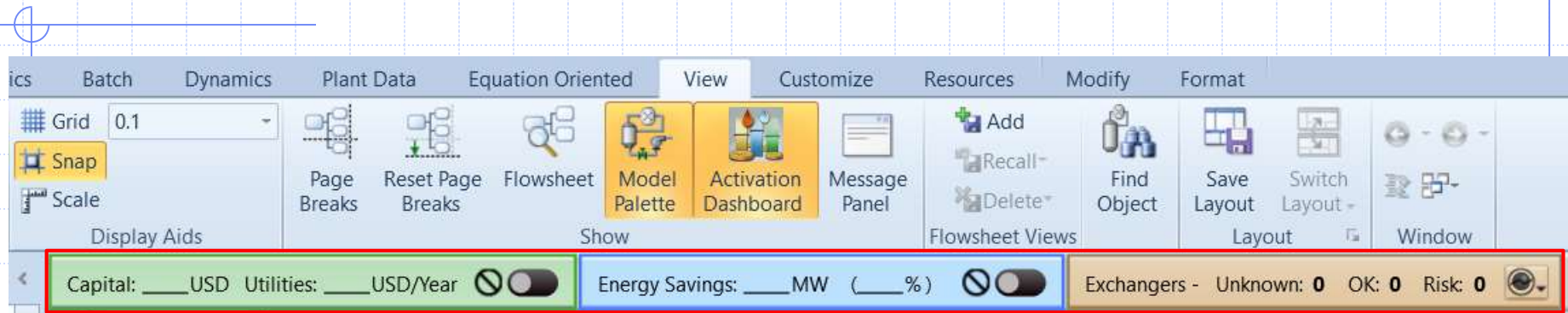
Sensitivity & Optimization

Equation Oriented approach

Results obtained

Dynamic parameters

Activated Analysis



◆ Tools built-in to Aspen Plus to aid in process analysis and optimization

- Activated Economic Analysis: provides high level cost estimates useful for comparing process alternatives
- Activated Energy Analysis: looks for opportunities to reduce energy consumption using pinch technology
- Activated Exchanger Analysis: allows quick access to rigorous heat exchanger design and rating programs from Aspen Plus

A survey of process simulation software

Steady state simulators and batch

- Aspen Plus (Aspentech)
- Hysys.Process (Aspentech)
- PRO II (Sim Sci)
- COCO (AmsterChem)
- DWSIM (open source)
- Chem CAD
- Process
- Prode simulator (Prode SW)
- ProSim
- Super Pro designer
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Dynamic simulators

- Speedup→Aspen Dynamics (Aspentech)
- Batch model - DynSim (Sim Sci)
- Hysys.Plant (Aspentech)
- gPROMS (PSE)
- Batches
- ASSETT (Kongsberg digital)
- JADE (GSE systems)
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