The planning challenge for refineries, petrochemical plants and Oil & Gas facilities is to determine the optimal feed and product mix, and the most profitable way to operate the plant taking into consideration varied supply, demand, prices, product specifications, production as well as supply & distribution asset capabilities.

Planners solve a variety of problems using their planning tools. These range from the impact of long range capital projects; decisions to make a new product mix; process new feedstocks or significantly vary the operation of the plant due to asset limitations. In each case, the planner uses the overall plant model and economics to determine the optimal solution.

Honeywell’s Refining and Petrochemical Modeling System (RPMS) is designed specifically to answer the demands of the planning process. Using RPMS, planners can integrate all of the constraints that affect their plans using data from a variety of sources and then develop the optimal solution rapidly and accurately.

Benefits
- Maximized profitability through development and optimization of refining, petrochemicals and Oil & Gas models
- Use of planning tools for the full range of planning processes – from strategic to short term operational plans
- Embedded domain expertise for refining and petrochemical modeling
- Faster and more efficient planning and decision making
- Intuitive User Interface allowing new users to become experts faster

Modeling Components
RPMS provides a proven tool for developing a mathematical structure (model) representing any refinery, petrochemical or O&G facility. RPMS makes use of the latest version of XPRESS Optimizer from FICO

Multi-Period Modeling
The RPMS multi-period module supports modeling across multiple time periods with user-defined intervals. This option is valuable in a number of applications, including inventory management, analysis of discounted cash flows across time and inclusion of varying processing capacity at intervals within an overall operating plan. Results for multiple periods are made available through the flowsheet and reports.

Multi-Plant Modeling
The RPMS multi-plant module generates mathematical models for the solution of broader supply chain management problems. Each individual operating plant can be represented to any required degree of detail and incorporated as a sub-model in the broader optimization problem. Model structure is added to represent the overall supply chain (i.e. terminal, pipeline, mode of transportation, terminal blending, exchange agreements, etc.)

Mixed Integer Programming
RPMS allows to build any discrete decision with ease through the use of mixed-integer programming. This technique allows user to specify, for example, that a raw material must be purchased at a minimum level or not at all (soft minimum). RPMS includes soft minima for materials purchase and sales, as well as turndown capacities for operating units.
Handling Non-Linearities

RPMS provides accurate feedstock selection by means of distributive recursion and error tracking, which enable the LP to see differences in byproduct stream properties. Distributive recursion allows RPMS to associate the effect of changing feedstock with a change in properties of byproducts. This concept is used in various ways to allow representation of non-linear relationships and control convergence to an optimal solution.

Pooling

RPMS is unique in its ability to handle process plant pooling problems. Techniques available to perform this task include the following:

- Representation of many different process unit logical operating modes
- Flexibility to combine or segregate feedstock and/or byproduct streams on a stream-by-stream basis
- Ability to combine streams explicitly for subsequent dispositions while correctly tracking quality effects
- Implicit pooling of byproduct streams to be sent to downstream dispositions in the same proportion as they are produced, without actually combining the streams

System Components

Refining Process Database

RPMS offers a refining database that provides a comprehensive selection of process unit sub-models and investment-capacity relationships for the most commercially available processes used by the refining industry worldwide. The database contains sub-models for both volume- and weight-based process units, offering complete flexibility in customizing refinery models, middle distillates and fuel oils, and quality data for most intermediate refinery streams.

Chemical Process Database

The RPMS chemicals database contains a broad range of petrochemical processes and products. Sub-models for more than 100 chemical processing units (and associated investment costs) are included. Finished products include synthetic fibers, synthetic rubbers, resins, plastics, solvents, plasticizers and fertilizers.

User Interface Components

Graphical User Interface (GUI)

The RPMS user interface provides a graphical view of the plant. The characteristics of the display can (and should) be modified to provide an intuitive image of the complete model for execution and modification purposes. The intuitive graphical UI in RPMS can be used to easily view the exceptions, limiting constraints, solution results, edit tables and navigate through the solution results, improving the overall end user experience.

Managing Data (Data Factory)

The RPMS Data Factory is an integrated Microsoft Excel application for displaying and manipulating RPMS model data using Excel worksheets. The usual spreadsheet facilities are available for adding or deleting rows or columns, performing calculations, copying and pasting between worksheets, changing appearance and printing. This table-oriented view is fully integrated into the overall user interface. Different views of a table can help to clarify case or period data differences. RPMS provides context sensitive navigation to the relevant tables for the selected object from the flowsheet.

Reporting (HTML and Report Factory)

RPMS provides a standard set of reports in HTML and Text format that are automatically created. The HTML reports can be easily shared across the organization and navigated on a browser or mobile device. The RPMS Report Factory is an integrated Excel application that produces the standard RPMS reports, as well as user-designed reports, in the form of Excel worksheets. User-defined reports are designed using regular
spreadsheet facilities, and the package includes a library of user functions provided specifically to process model related information. The Report Factory is a very powerful application that can produce reports in almost any conceivable format.

**Model and Case Management**

RPMS provides a clear view of all models which have been built and allows the user to organize, group and access these easily using a model tree. It also provides ability to compact and backup or restore point (can also be set up for automatic) models.

RPMS also provides powerful yet simplified capability to create, manage and solve cases through excel spreadsheet.

**Investment Module**

RPMS has a unique investment module that gives the model a choice of investments, e.g. hydrocracking, resid cracking, hydrotreating, etc. RPMS uses a non-linear investment cost vs. capacity relationship. Also considers various elements such as escalation factor, fixed operating expenses, catalyst loading cost and paid up royalty, plant service factor, tank cost and offsite investment, maintenance cost, salvage value and capital recovery factor, among others.

**Other Features**

RPMS provides a facility to import the crude assay data generated by ASSAY2 or any other crude assay management tool, based on a predefined format.

RPMS provides the capability to interface with simulators via excel or specific executable to update yields and properties during the optimization cycles, using a predefined format.

For More Information

Learn more about how Honeywell’s RPMS can help with the planning challenges at your refinery, petrochemical or oil & gas facility, visit our website [www.honeywellprocess.com/software](http://www.honeywellprocess.com/software) or contact your Honeywell account manager.

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