S M O C

YOKOGAWA

Shell Multivariable Optimising Controller

Advanced Process Control Technology for the Process Industries

SMOC is Shell Global Solutions' Multivariable Optimisation and Control suite of software packages. SMOC provides the tools necessary to design, implement and maintain multivariable Advanced Control strategies to effectively improve plant stability and maximise plant profitability for the Hydrocarbon Processing and Chemicals industries.

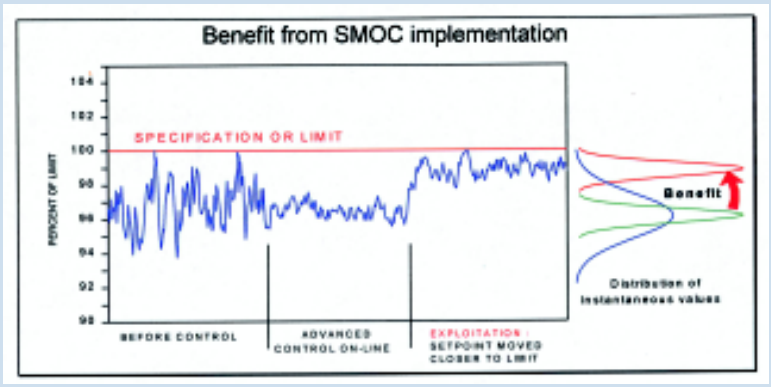
Key characteristics of SMOC:

- Highest Uptimes in industry (i.e. highest benefits)
- Use of unmeasured disturbance models and grey box models to include apriori process know how resulting in high robustness
- Easy to use design and simulation kit (off line)
- Embedding in DCS (no special interface software or doubling of databases)

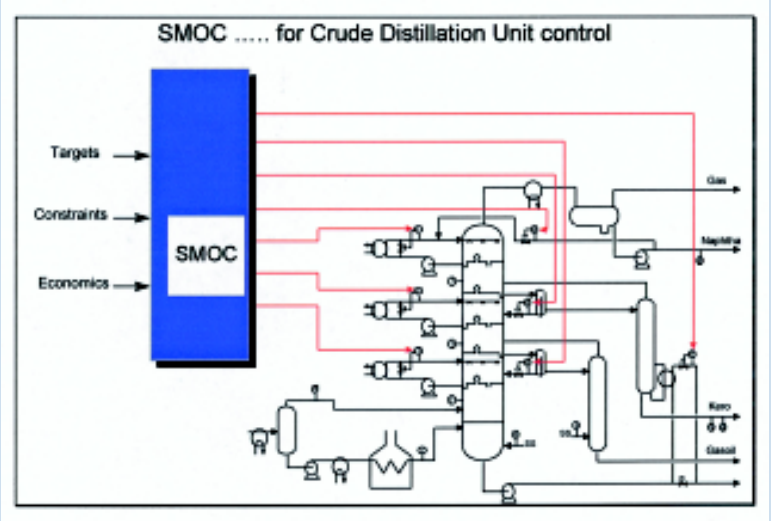
Shell Global Solutions Advanced Control engineers,with the support of in-house instrumentation and process experts, offer the whole spectrum of services for successfully implementing SMOC, including benefits study, control system engineering, commissioning and applications maintenance.

Applications

SMOC has been successfully applied to over 430 applications world-wide on process units such as Crude Distillation, Fluid Catalytic Cracking, Hydrocracking, Lube Oil, Styrene, Ethylene Oxide /Ethylene Glycol plants and other major refinery and petrochemicals units. SMOC is recommended to safely push a unit towards its constraints, maintain key operating variables at desired targets, while maximising the unit profit function with all available operating handles.



Benefit from SMOC implementation



SMOC ..... for Crude Distillation Unit control

Bull 36J06D10-01E

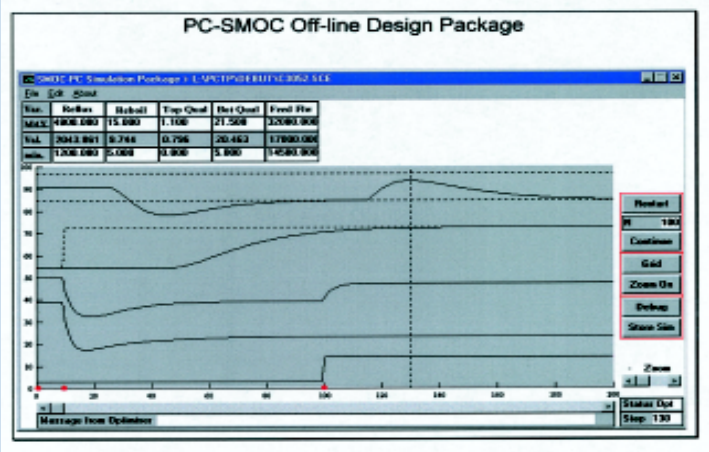
Product Description

SMOC involves the following integrated software modules :

- AIDA off-line modelling package :
  AIDA (Advanced Identification and Data Analysis) is a Windows based package used to process dynamic plant test data and derive the model needed by SMOC. User-friendly help menus, graphics and calculated statistics allow the model to be quickly built and validated. AIDA has been designed and tested to be robust in handling noise and disturbances typically present in actual plant test data sets.

- PC-SMOC off-line controller design package :
  PC-SMOC is a Windows based package, integrated with AIDA, to design, test and build SMOC controllers. The process dynamic model is generated by AIDA. Alternatively, the model may be built using the Graphical Model Builder. PC-SMOC allows the user to simulate the controller behaviour to test the tuning, robustness to model errors and optimisation performance. The final stage in the off-line design is the creation of the SMOC controller file, for use by the on-line controller.

- SMOC on-line controller :
  The on-line controller incorporates all functions required for the operation of the controller in real time. This includes signal validation, initialisation, mode shedding, standard operator and engineer interface, and controller engine. The same SMOC on-line controller is available in versions running on different platforms either at the DCS level (Honeywell AxM/TPS, Foxboro IA, Yokogawa CS) or in a process computer system with SETCON, Info Plus, PROSS 2 or OSI's PI .



PC-SMOC Off-line Design Package

TECHNOLOGY

SMOC is a model based multivariable predictive controller, with the following special features :

- **Economic optimisation capability :**
  SMOC allows the user to continuously optimise his defined economic function as part of the control calculation.
- **Simple on-line tuning of the controller performance** by specifying the desired speed of response for set point tracking, disturbance rejection and feed-forward control.
- **Handling of intermediate variables for enhanced controller performance :**
  fast responding intermediate variables, that provide an early indication of the future behaviour of the controlled variables, can be included in the controller to allow more robust and timely control actions.
- **Efficient use of CPU resources by the on-line controller :**
  to minimise on-line CPU usage, the controller matrix is pre-calculated off-line, and use is made on-line of a Relaxation algorithm, to efficiently resolve constrained optimisation, and control the execution time.

YOKOGAWA

Japan
Yokogawa Electric Corporation
System Integration Solution Group
2-9-32 Nakacho, Musashino-shi,
Tokyo, 180-8750 Japan
Tel:(81)-422-52-6437 FAX: (81)-422-52-0557

United States
Yokogawa Control of America
Advanced Automation Division
401 S.Dewey, Suite 401, P.O Box 848,
Bartlesville, OK 74005
Tel: (918)-337-0918 FAX: (918)-337-0968

Singapore
Yokogawa Engineering Asia Pte. Ltd.
South Asian Headquarters, APC Centre
5 Bedok South Road Singapore 469270
Tel: (65)2419933 FAX: (65)2419919

Europe
Yokogawa Europe B.V.
European Headquarters
Vanadiumweg 11, 3812 PX Amersfoort The Netherlands
TEL: (31)-33-464-1611 FAX: (31)-33-464-1610