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- Aesica Pharmaceuticals
- A H Marks
- BP
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- ConocoPhillips
- Centre for Process Innovation
- DEFRA
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- Eli Lilly
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- GlaxoSmithKline
- Hickson
- Holliday Pigments
- ICI
- Imerys
- J R Crompton
- Johnson Matthey
- Manro
- Newcastle University
- Norsk Hydro
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- Strategem Consulting
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- Sulzer
- SWRDA
- Syngenta
- Synthomer
- Technical Absorbents
- Tensachem
- University of Sheffield
- University of Strathclyde

## Advancing Continuous Improvement at Johnson Matthey

Johnson Matthey is a speciality chemicals company focused on catalysis, precious metals, fine chemicals and process technology. For almost 200 years it has continuously developed its technology, and retains world leadership by adapting constantly to changing customer needs. With operations in over 30 countries and over 8,700 employees, its products are sold around the world to a wide range of advanced technology industries. It is a world leading manufacturer of catalysts for vehicle exhaust emissions control.



The company has a worldwide reputation for excellence in catalysis and precious metals technology, and has received the Queen's Award no less than ten times, for Export, Technology, Environment and Innovation.

Having first assessed the applicability of the MS2 Process Diagnostics System to its complex and highly innovative processes, the Company has now invested in no less than eight MS2 systems, all of which include the advanced real time multivariate technologies developed by AJM Consulting's EU-funded Project Hawk.

*Photographs reproduced with permission from Johnson Matthey*

*"Our complex processes and continuous advancement in technology lead to a need for rapid and comprehensive understanding of our wide-ranging processes. To facilitate this we investigated the opportunities presented by the MS2 Process Diagnostics System from AJM Consulting. An initial trial on a single plant section proved its applicability to our business.*

*We have now invested in more powerful versions of the system and are implementing it in various areas of our business where its ability to visualise the interactions between many variables assists us to improve our understanding of the innovative processes we have developed, and upon which much of our business depends."*

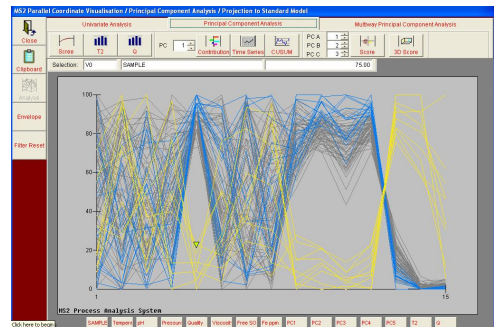
**Mike Child, Johnson Matthey**

## The MS2 Process Diagnostics System

MS2 is a sophisticated, integrated system which models the production process, either batch or continuous, to help identify the causes of variability which can affect issues such as quality and yield. A wide range of analysis tools and visualisation methods have been developed to pinpoint critical process influences. The system incorporates powerful techniques such as multivariate principal component analysis, Manhattan significant change detection and parallel co-ordinate visualisation.

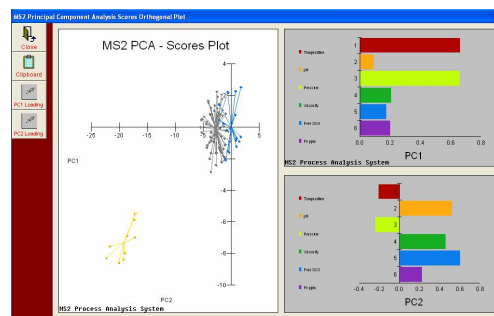
### Parallel co-ordinate visualisation

This technique provides a view of relationships between many diverse process variables, for instance quality parameters such as pH and viscosity, process parameters such as maximum pressure and temperature and calculated values such as time to peak exotherm or shift identity.



### Principal Component Analysis

The complex multivariate analysis and visualisation tools needed for this powerful technique were developed in conjunction with the world-renowned Centre for Process Analytics and Control Technology (CPACT) at the University of Newcastle. PCA provides a method of reducing the apparent complexity of large data sets to identify the principal causes of variability. It is proven to provide substantial bottom line benefits in major organisations and, through MS2, is now available to all sizes of company.



### Ease of Use

The MS2 Process Analysis System was developed by AJM Consulting to bring advanced techniques within the reach of all companies, recognising the need for low ownership cost and limited on-site personnel involvement. Technologies developed for and applied to large organisations are often just too complex and expensive for most process manufacturers and the philosophy behind the MS2 Process Analysis System is to make advanced technologies accessible and affordable with immense potential benefits to competitiveness.

### Latest Developments

AJM Consulting was selected to receive European Union funding, to enable it, in conjunction with CPACT, to design and build a unique tool, able to analyse existing data or monitor current production, by integrating to a wide range of process control or data historian systems.



AJM Consulting is working in conjunction with Newcastle University to continue development of the advanced MS2 system

This project is part-funded by the European Union Regional Development Fund

Available at several levels of cost and complexity, and easily upgradeable, MS2 is ideal for all process manufacturers who need better knowledge of their processes to achieve improved production performance and a sustainable future.

AJM Consulting is a member of:

- Institute of Measurement and Control
- Humber Chemical Focus
- Yorkshire Chemical Focus
- North East Process Industry Cluster
- Chemicals NorthWest
- CPACT



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