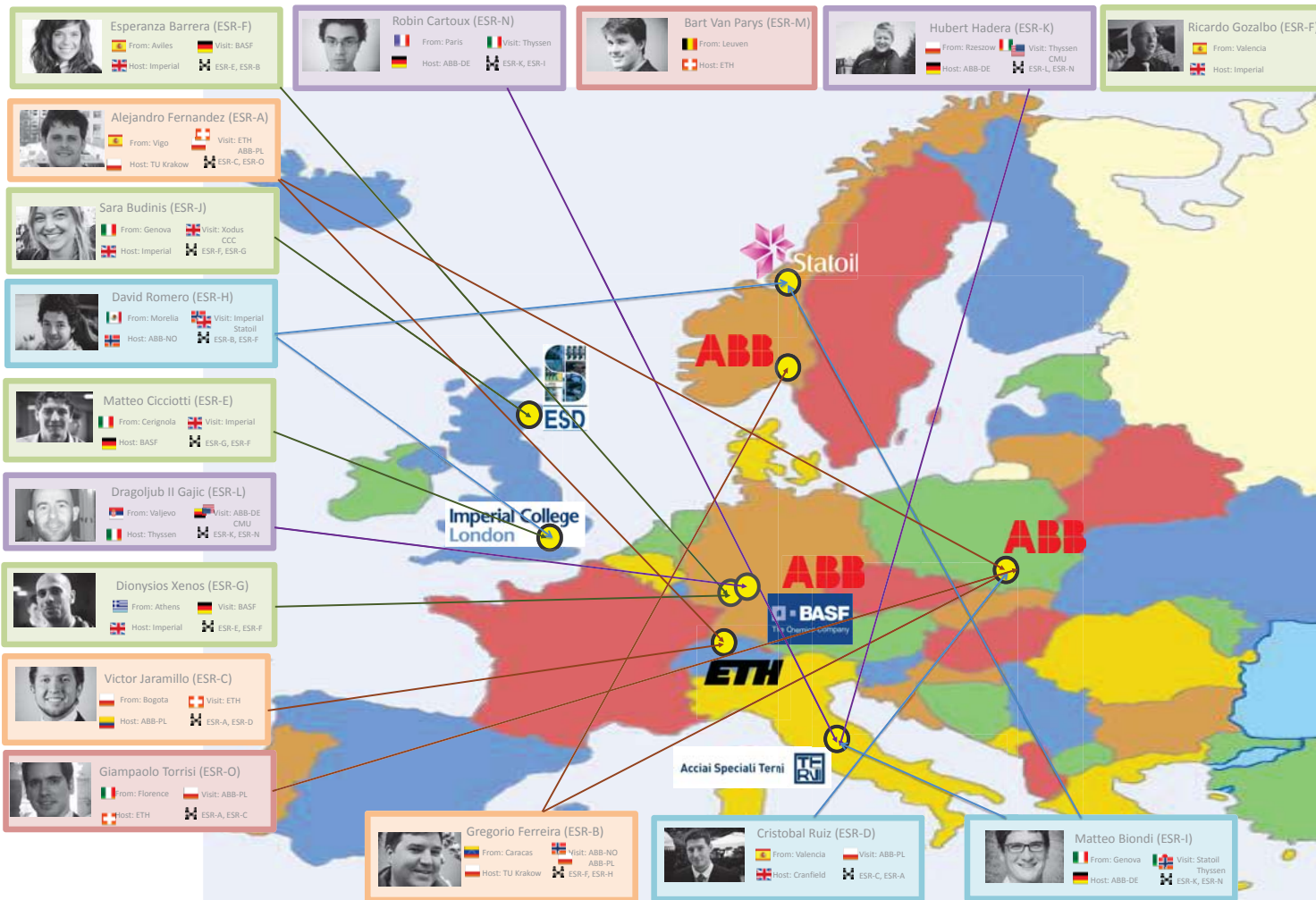


# Energy-SmartOps Integrated Control and Operation of Process, Rotating Machinery and Electrical Equipment

## energy smartops **Secondments in Europe**



### A selection of joint papers

Contents lists available at [ScienceDirect](#)

**Applied Energy**  
Journal homepage: [www.elsevier.com/locate/apenergy](http://www.elsevier.com/locate/apenergy)

**Optimization of a network of compressors in parallel: Real Time Optimization (RTO) of compressors in chemical plants - An industrial case study**  
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**VIBRATION ANALYSIS**  
**Detection of machine soft foot with vibration analysis**  
F. Elasha, C. Ruiz-Carcel, D. Mba, V.H. Jaramillo and J.R. Ottewill  
Submitted 17.05.14  
Accepted 05.08.14

**Improved Condition Monitoring using Fast-Oscillating Measurements**  
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<sup>a</sup>School of Engineering, Cranfield University, Bedford 31103Bulding, MK43 0AL, UK  
<sup>b</sup>ABB Corporate Research Center Poland, ul. Krakowska 114 03 Krakow, Poland

**Simultaneous nonlinear reconciliation and update of parameters for online use of first-principles models: An industrial case-study on compressors**  
Matteo Ciccotti<sup>a,c</sup>, Dionysios P. Xenos<sup>b</sup>, Ala E. F. Bouaswaig<sup>e</sup>, Ricardo F. Martinez-Botas<sup>g</sup>, Flavio Manenti<sup>h</sup> and Nina F. Thornhill<sup>h</sup>

**Computers and Chemical Engineering**  
Journal homepage: [www.elsevier.com/locate/comchemeng](http://www.elsevier.com/locate/comchemeng)

**Optimization of steel production scheduling with complex time-sensitive electricity cost**  
Hubert Hadera<sup>a,b</sup>, Iiro Harjunkoski<sup>a,c</sup>, Guido Sand<sup>d</sup>, Ignacio E. Grossmann<sup>e</sup>, Sebastian Engel<sup>b</sup>

**ARTICLE INFO**      **ABSTRACT**  
Article history:      Energy intensive industries can take advantage of process flexibility to reduce opera-

**Overall aim**

The overall scientific and technical aim of the ENERGY-SMARTOPS project is to take a pivotal role in demonstrations of creative ideas for energy savings in large scale industrial sites making the best possible use of measurements from all plant subsystems: process, utilities, mechanical equipment and electrical equipment. The project integrates in-depth understanding of the operational issues with analysis of measurements and first principles physical knowledge to invent and develop tools that will be deployed in the field in case studies with the transmission operator partners. Three specific research objectives are:

- To develop scalable and complete equipment monitoring systems.
- To devise new algorithms for overall performance monitoring and control
- To study ways that energy savings can be achieved

**Project goals and scope**

Execution of the ENERGY-SMARTOPS project involves activities in five work package each of which will address one or two of three Research Objectives, as follows:

- Research Objective 1: To develop scalable and complete equipment monitoring systems
- Research Objective 2: To devise new algorithms for overall performance monitoring and control
- Research Objective 3: To study ways that energy savings can be achieved

The project is organized in 5 Work Package (WP), which are shown in the figure to the right. Each one has been organized in a way that it includes at least one industrial partner and one or more universities.



- Institutions involved**
- Imperial College London
  - ABB (Germany, Poland, Norway)
  - Cranfield University of Technology
  - ETH Zurich
  - BASF
  - Cranfield University
  - ThyssenKrupp Italy

- Associated partners**
- Carnegie Mellon University
  - Statoil
  - ESD Simulation Training



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