The Benefits of Advanced Process Control (APC) Applications for the Vinyl Chloride Monomer (VCM) unit, Ertuğrul Özdoğan and Osman Erkan, Petkim Petrochemicals Co.

Honeywell has successfully completed an Advanced Process Control project on Petkim Aliaga’s Vinyl Chloride Monomer (VCM) unit. The application covered both the cracking and the distillation process sections which involve ethylene dichloride (EDC) cracking furnace, HCl and VCM distillation columns. It was a technically demanding project, the main challenge being to increase the conversion of EDC to VCM by improving the temperature control on the EDC cracking unit and by increasing the operating efficiency of the quench system. Due mainly to cooling constraints in the refrigeration system, the HCl column top pressure was previously operated in manual, therefore any disturbances in the top pressure resulted in a detrimental effect for the cracking furnace operation, affecting mainly the overall conversion. By exploiting the multivariable nature of the Profit Controller, the variations in the HCl top pressure have been minimised, henceforth achieving more than 6% improvement in conversion. Along with the objectives of increasing the conversion, energy savings have been proved around the specified process sections by implementing smooth control and efficient disturbance rejection. As such, the throughput - constrained by the cooling system capacity - could be increased, and reduction in the steam consumption was achieved at various parts of the VCM plant. The project proceeded efficiently and was completed with a performance test run. The Profit Controller application achieved an overall ROI of less than 4 months.

This presentation describes how the APC controllers were implemented in the VCM process and demonstrates the effect of APC by comparison of the process data before and after the project.

Yanbu Natural Gas Liquid Fractionation Plant (NGLF) Multivariable Control and Dynamic Optimization, Salah Ali Al Ali, Saudi Aramco

Background & Challenge:
Yanbu natural gas liquid fractionation plant (NGLF) has two parallel NGL fractionation trains each including deethanizer, depropanizer and debutanizer columns. The plant DCS is a TPS/TDC3000 system and the existing APC infrastructure includes Profit Controller and Profit Optimizer. A new deethanizer column was added to the plant with its bottom product joining the existing deethanizer columns to feed the existing depropanizer columns in both trains.

While the new deethanizer design is similar to the existing deethanizers, the overall product control and feed optimization for the entire fractionation plant is more complex than adding a third parallel train. The new deethanizer bottom product split to the existing trains, and the range of normal operation, introduces non-linearities that the overall control and optimization solution must address and handle appropriately.

Solution:
Saudi Aramco selected Honeywell as a partner to design and implement new deethanizer column APC and integrate it with a redesigned control and optimization solution for the NGL fractionation complex. The project was initiated in Oct 2010 and scheduled with the typical APC project execution steps: plant pretest, plant test, functional design, controller and optimizer model identification, detailed design, and finally controller, soft sensor and dynamic optimizer commissioning. Commissioning for this project was planned for March, 2011.

During the detailed design phase, the Saudi Aramco and Honeywell engineering team identified the non-linear control and optimization challenges with this project implementation. The technical and software licensing solution proposed by Honeywell included implementation of
online UniSim study-state simulation models to augment the redesigned Profit Controller and Profit Optimizer applications. The UniSim models provide key gain values that allow the controller and optimizer to adapt to the non-linear changes in the operation. With the online models in place for gain updating, key stream properties can be predicted where empirical inferential are not easily implemented and online analyzers are not yet available. Implementation of the UniSim model interfaces was simplified by using a recent online version of Profit Suite. To facilitate this Honeywell supported Saudi Aramco to upgrade all online Profit Controller and Optimizer applications from release 205.1 to 320. The project commissioning was completed by the middle of March 2011.

Benefits:
Yanbu natural gas liquid (NGL) fractionation plant was faced with integrating a new deethanizer column APC with existing advanced control and optimization applications in a very short timeframe. The control solution required a more complex solution than initially anticipated, but Honeywell provided the technology and expertise to implement it in a very short time.

Project benefits will be evaluated after several months of operation, and are expected to include:

- More stable ethane header pressure control for local customers with far fewer manual operational changes
- Smoother and optimal feed distribution management across the three deethanizers
- Optimized propane production with improved quality control to local and export customers
- Optimum operation of existing and new facilities within plant equipment load constraints, especially during summer periods.

Successful Retrofit of Atmospheric Continuous Catalyst Regenerator Lock Hopper Control System in Grupa LOTOS SA Gdansk Poland, by UOP and Mirosław Jarzemski, LOTOS Serwis sp. z o.o.

When in 1994 Rafineria Gdanska decided to build UOP licensed CCR Platformer the available Control System of catalyst regeneration was Monirex, Model 2000-00. The major features of this system were:

1. Programmable Controller Simatic TI incorporating non-volatile Read Only Memory enabling:
   - Control of the Catalyst flow through the Platformer and Regenerator.
   - Initiation of emergency shut-down sequence.
   - Operation of the regenerator heaters.
   - Introduction of nitrogen or air to the regenerator as necessary.
   - On/Off Control of Chloride injection into the chlorination zone of the regenerator.
   - Diagnostics for ensuring proper controller operation.
   - Indication of plant operation status on a graphic display.
   - Integrated alarm system.
2. The custom designed program for our plant.
3. Safe operation utilizing:
   - Specially designed built-in proprietary hardwired safety interlock system and Programmable Controller malfunction detection system.
   - Program non-modifiable by operator.

In addition to the controller mounted in a dual bay cabinet the package included a display panel with dedicated graphic display of the process status, operator control switches for controller operations, shutdown bypass system, controller system power distribution and an annunciator alarm system.
This system was working successfully over 16 years and get old. That was the main cause we asked UOP to add a new technology and features to Monirex. Moreover due to plans of control room modernization we couldn’t find enough space to all those cabinets. That was also the question of access to the spare parts for old PLC and hardwired safety interlock system. Therefore from UOP proposal for new system we have chosen the programmable Electronic system based on Honeywell FSC. There is over 20 FSC’s working in our refinery at the moment.

The subject of this presentation will be the comparison of a new and old UOP Atmospheric CCR Regenerator Control Systems, their interfaces to DCS, connection to SER, SCADA visualization, new features and problems we faced during this implementation. I will compare the HMI of both systems. This presentation will show the work done by UOP and Lotos Serwis during implementation, acceptance test and startup of the new system in limited to 60 hours time for switchover.

Virtualization and OneWireless Technologies Implementation in Industrial Scale, Veselin Kutsarov, Lukoil Technology Services Burgas

Several modernization projects has been done in Lukoil refinery in Burgas in recent years. As part of those projects, Uniformance PHD has been implemented as a plant-wide historian. Together with new DCS technologies, BusinessFlex applications like Production Balance and work center were put in operation. Virtualization has been intensively utilized during the project.

Plant-wide Informational system requires data that was not previously available and OneWireless system is to be installed over the refining part of the plant.

This presentation shows technical solution and challenges during implementation and operation and ideas about suitability and reliability of the current technology.

Lifecycle Management: Control Spares Management, Modeled with Monte-Carlo Simulation, Morne Booysen, Sasol Synfuels

Lifecycle management for control systems is an important focus for large and mature sites such as Sasol Obsolescence is a significant challenge due to the age of running equipment specifically for TDC2000 equipment installed in 1979. Variables like upgrade rate, unexpected failures, spares stock levels, repair time and their inter dependencies make this a complex problem. For Sasol, the need for managing obsolete equipment is essential; therefore we track a detailed roadmap of what spares, move when and where on our site. However, optimizing and justifying this refurbishment plan requires some engineering ingenuity. Many parameters influences obsolescence, but very few scientific estimations of the real impact or a simple explanation, which defines it well, exists.

For the TDC2000 roadmap Sasol has now developed a Monte-Carlo simulation model to test for various scenarios in terms of spare levels, technology failure rates, repair time lags, etc. and make qualified decisions of the risk and most probable outcome of each scenario. This tool will enable Sasol to optimize and justify their different roadmaps and build detailed business cases. The tool will also help to plan according to external forces such as availability of specific spares being supported / repaired / sold in the market and align with Honeywell programs such as

Details at: www.honeywellusersgroup.com
Highway Care. It can also be rolled out to any other obsolete systems, which has sufficient captured data on failure rates.

The presentation will give the background leading to the need for this simulation; and discuss the process followed as well as the outcome of this newly developed Monte-Carlo simulation, and what scenarios can be tested for in the risk analysis.

The Story of an Operator Training Simulator upgrade - how BP turned an Ageing Swan into a Golden Goose, Phil Jones, BP

BP Hull site’s A4 Carbon Monoxide generation plant recently commissioned a new reformer unit. The previous unit was operational for over 30 years and coming to the end of its life span. The new unit was required to allow continued operation of the plant & improved reliability, potential future de-bottle necking and environmental improvements.

To successfully deliver the benefits of this project, extensive use of an Operator Training Simulator (OTS) was essential for plant Engineers, Supervisors and Technicians to familiarise with the changes & rehearse start up, normal running & controlled & emergency shutdown scenarios prior to commissioning the new unit.

A high fidelity OTS already existed but it was authored in an obsolete platform that would be difficult to modify or expensive to rebuild in a more modern platform. The capability of Honeywell's USO platform allowed a technically elegant and cost effective way out of this dilemma.

The project undertaken with Honeywell in 2010 required the following changes:

- Extensive process modifications of the existing legacy model for the new reformer
- Addition of a new FSC for the new reformer ESD logic
- Extensive modification of DCS configuration, control schemes and Process Schematics for the new reformer

Additionally, the opportunity was taken to migrate from the existing obsolete OTS platform and align this model with Hull Site’s OTS strategy. This strategy’s aim is to move all our models to a modern, supported platform capable of being maintained and updated into the future.

This project again demonstrated that simulators are not only for training and identified and forced the correction of many faults in the DCS configuration and Process Schematics which would have delayed the actual process start up with financial implications.

This joint presentation covers both the technical delivery challenges and the benefits derived from the end users perspective. We show that even a legacy model in an obsolete platform can be rejuvenated with comparatively small investment. This effort can be leveraged to deliver benefits far exceeding the original training intent. In our case proving operator competence levels to satisfy BP Safety Start Up Audit Team compliance guidelines (necessary to allow the commissioning) and customising/optimising plant operating procedures.

Operator Training Simulator Implementation and Training Experience at Slovnaft FCC Unit, Tomáš Pavlík, Slovnaft, a.s.

Operator Training Simulator (OTS) implementation at FCC unit in Bratislava refinery started in 2007 with expected project handover in May 2009. Due to various obstacles the project was successfully finished in January 2011.

First part presentation will be aimed on the experience with OTS implementation – project startup, project team creation, various phases of the project. Factory acceptance testing phase
where most of the problems with model deficiencies have surfaced and which took more than a year will be covered in detail.

Second part of the presentation will deal with current status of the OTS and our experience with trainings. Training methodology and scheduling will be described. Operator response to the system will be presented.

**Alarm Management : wasn’t that problem already solved years ago?** Luc De Wilde, *Total Petrochemicals Research Feluy*, on behalf of the ASM Consortium

With the introduction of DCS, many operating companies were “suddenly” confronted with an alarm management problem: too many active alarms, alarm floods, important alarms not seen, etc. Both operating and vendor companies started to work on the problem by creating an alarm philosophy, doing alarm rationalization, creating an alarm reference database, applying advanced techniques, and so on.

Today, 20 – 30 years later, the problems are not all solved, at least that’s the perception of management.

What is different today? Or is it not different from 20 – 30 years ago? We all applied the industry standards, didn’t we? ISA 18.02, EEMUA 191.

We all followed the ASM consortium guideline, at least that’s what we told management. When we consider the ASM consortium guideline *Effective Alarm Management Practices*, there are many recommendations. However, many sites just follow some of the recommendations, not all. This creates gaps in their overall alarm management approach. This presentation will detail the most important recommendations described in the guideline and highlight the “critical success factors”.

Also, the ASM Consortium’s efforts on alarm management have not finished with the publication of the guideline. While the industry seems to be getting at better handle on ‘normal operations’ and achieving reasonable alarm rates for steady-state, we still struggle with alarm flood situations. Research is continuing, to improve the understanding and to develop methodologies, new tools, and new operator support that will help operating companies to pursue further improvements. A brief overview of the research activities in the area of alarm management will be discussed.

**From TDC2000 to Experion thru TDC3000,** Jose Maria Martin Algarra, BP Refineria de Castellon, S.A.

On 2001, Castellón refinery decides to replace the ancient TDC2000 controllers (BC, EC, MFC, LEPIU, HLPIU, PMX, etc.) in the plant for the TDC3000 controllers HPM, to sustain the life of the plant and use the new control capabilities, without disruption of the functioning of the units. On this approach, we prepared also the plant for the (then) coming EXPERION technologies. During 10 years, the new projects and revamping of the units had used this new control platform with success.

Today we are in a continuous evolution and we have integrated the new control equipment EXPERION Servers and stations and we are now prepared to use it in our control and plant information strategies, among the new technologies for control and connectivity.

The most important APC application on Ethylene cracker is the reaction severity/conversion control, therefore a reliable analyzers are mandatory to calculate the correct severity/conversion on an ethylene cracker.
Real time UniSim to Improve Ethylene Plant APC by Predicting Furnace Conversation and Plant Properties, Hamad Junaid Al-Enazi, SHARQ/SABIC

This issue can be solved using a regression based models which can predict the correct Furnace Effluent Analyzers measurements by using the data generated from extensive kinetics models runs and used to generate a Regression model.

An example of real time implementation of Unisim design consisting of gas crackers and a simplified back end flowsheet representation where it is used as a basis for furnace conversion predictions using furnace operations data. The back end separation columns are modeled as steady state separation units where components are fractionated using constant separation factors based on nominal mass balance data. Hydrogenation reactors are modeled using open equations describing the kinetics equations happening in such units. All other properties when modeled adequately can be predicted from this solution. This is applicable for such properties as molecular weight, final products flows (ethylene, propylene, ethane and propane recycle, BTX, etc...). Predicted properties can be compared to measured values for a validation purposes - furnace conversions, molecular weight - and be used a fallback to existing online measurements that are subject to failures.

An example of how to calculate the Furnaces conversion for both Ethane and Propane will be to take real-time data of hydrocarbon feed rate, steam dilution ratio, coil outlet pressure, coil inlet temperature and coil outlet temperature, and then the inferential calculations are generated using interpolation between intermediate points through the look-up table.

Change in the World as we know it – The Impact of the Transition to Open System Architecture, Hugo van Niekerk, Sasol Synfuels

The upgrade of the obsolete Windows NT PC infrastructure to the selected Windows 2003 server and Windows XP based infrastructure was recently completed at our CTL facilities. The upgrade entailed the large scale replacement of obsolete PC equipment across 37 Honeywell distributed control systems encapsulating more than 450 windows based nodes. It also included the upgrade of all systems and software which was incompatible with the latest release hardware to the compatible versions. Furthermore, the aim was to put in place enabling infrastructure which would allow the benefits of open systems to be achieved, such as shared services including a process control network, domain, file services and an anti-virus deployment server.

Some of the challenges that arose during the project execution included:
1) Dealing with the large amount of interconnected systems
2) Deploying infrastructure for which no or very little business processes existed
3) Clarifying roles and responsibilities during a multi-year deployment cycle where the project team itself did not remain intact for the full project duration.

This resulted in significant lessons learned with regard to the transition from proprietary systems to open system architecture.

The presentation therefore deals with the lessons learned during the project deployment. It deals with topics such as technology churn, resistance to change from existing workforce, the change in skill set required with the change in technology, lack of ownership as a result of change in system...
boundaries and overall change management. The learning creates some positive insight into the elements that await Honeywell customers who will be migrating from the conventional proprietary system infrastructure to the integrated open system architecture in the near future.

**Re-Instrumentation of Power Plant at Sasol’s Moers site, Dr. Christian Kramer, Sasol Solvents Germany GmbH**

The gas fired power plant was erected at Moers site end of the 1980s and was equipped with state of the art DCS and PLC systems for boiler control. By the time these systems became obsolete. In future spare parts and access to qualified service technicians are expected to become more and more challenging and any major defects could cause power plant down times of several weeks. Therefore Sasol carried out a migration onto an Experion PKS DCS and Safety Manager PLCs for boiler control. By the end of this project the whole site will be operated via Experion PKS systems, so that a common standardised operator interface within the central control room can be established.

After basic and detail engineering within 2010, the signal switch over took place in the 2nd and 3rd quarter of 2011. Challenges within engineering and project management of about 5,500 I/O signal transfers are covered as well as results of energy analysis. So the updated steam balance led to the decision to mothball one of the boilers. Furthermore the whole DCS community structure was re-organised and streamlined.

The presentation will end with optimisation suggestions for the project management of critical infrastructure migration projects, opportunities of increasing operator effectiveness due to a common operator interface and operating experiences with the Safety managers for boiler control.

**Honeywell DCS in Pharma Industry, Medard Krzyżyński, ZF Polpharma SA**

Presentation will show wide range of using Honeywell DCS in pharma industry (Fine Chemical Business Unit – production of Active Pharmaceutical Ingredients) and supported media plants (Wastewater Treatment Plant, Well Water Pump Station). Existing architecture with supervisory station located in automation engineering department will be presented.

The main part will show the realized functions and an approach to system implementation based on GAMP methodology (Good Automated Manufacturing Practice) and computerized systems policy obligatory in our factory. GAMP guideline is the most extensive document describing requirements for CS (Computerized Systems). Documented evidence of system qualification are reviewed during authority inspections (incl. FDA – Food and Drug Administration, USA).

Finally will be presented some examples of system functions (control of chemical and wastewater processes, monitoring of ventilation and gas detection systems), recent extension during life cycle and possible expansions in the future.

**OTS – State-of-the-Art Training Method for Panel Operators, Tomasz Bytner, Grupa LOTOS S.A.**

Refinery of Grupa LOTOS S.A., Gdansk, Poland continuously develops panel operator training by means of OTS. We have successfully implemented first OTS projects which significantly improved our panel operator training. This made us certain that new training method is worth of further development and we have decided to contract new OTS systems.

Details at: [www.honeywellusersgroup.com](http://www.honeywellusersgroup.com)
Today, after 2.5 years since first OTS contract with Honeywell was signed, we are going to share our experiences gained during each phase of the OTS projects and training practices applied in Grupa LOTOS S.A. We will also discuss pros and cons of the two phase approach to the OTS projects, accuracy of the models and DFS issues.

Implementation of Advanced Process Control on Solvent Recovery Unit of AKSA Acrylic Chemical Plant, Ece Alagoz, AKSA Acrylic Chemical Plant
AKSA Acrylic Chemical Plant is the leading producer of acrylic fibre with more than 12% of the capacity need in the world. Solvent Recovery Unit of AKSA is responsible for the separation of Dimethylacetamide (DMac) from spinning solution. The plant has significant challenges in terms of energy consumption, variable feed capacity with different compositions, undesired hydrolyse reaction of DMac, ambient temperature-dependent and highly integrated 4th effect columns distillation process. In order to satisfy production with sufficient purity, distillation process requires coordinated control system.

For the environmental issues, the DMac content of acrylic fiber is crucial for the production quality. The main parameters affecting this quality are the solvent concentration in the washing recovered water of fiber and the acidity in the recovered solvent used for the dope preparation in the Spinning Unit. Operators were controlling these qualities by manually adjusting the steam, reflux and bottom product flows in the distillation columns, according to the column top bed temperatures. Significant effect on the process comes from the energy released in the 1st effect distillation column. This determines the operators to closely monitor this column.

Advanced Process Control (APC) application has been implemented with Profit Suite software from Honeywell Process Solutions, hosted by an APC server linked to the plant control network. The main objectives of this application are to reduce steam consumption, maintain the quality specifications and stabilize plant operation. In order to achieve these targets, a Robust Multivariable Predictive Control (Profit Controller) strategy has been used. For the quality control, several inferential calculations have been developed with the Profit Sensor Pro software tool and have been implemented on-line on the APC server. The feedback from the laboratory analysis has been used to update the inferential equations on the APC server. A dedicated software interface, for communication between the APC server hosting Profit Suite and ABB DCS, has been implemented during this project.

After the online commissioning, APC system proved to be a valuable application, especially for the control of the 4th effect columns distillation process of AKSA Solvent Recovery Unit.

The use of Honeywell’s “Safety Manager” in the IEC 61511 Certified Applications, Rafał Selega, Lurgi S.A.
In today’s world many potentially dangerous plants are protected by specialized Safety Instrumented Systems and application software. This includes oil refineries, chemical processing plants, nuclear power plants and medical plants. Safety related application software shall be properly design to handle the risks associated with a system. As a result, the issue of software safety has become a very hot topic in recent years. The leading international standards in this area are: IEC 61508: Functional safety of electrical/electronic/ programmable electronic safety-related systems and IEC 61511: Functional safety –Safety instrumented systems for the process industry sector. These standards’ popularity is on the rise, and more and more plants are being developed that conform to these standards. This creates an important question for designers: how is my system going to effect my certification? This presentation will attempt to explore the challenges and advantages of using the Honeywell “Safety Manager” system on plants that will undergo certification.
Honeywell's Applications for Planning and Accounting, Dr. V.I. Kuvykin and Dr. M.Yu. Petukhov, Lukoil-Norsi Refinery
This presentation looks at the integration of Honeywell APS, MES and process control applications at the Lukoil-Norsi refinery. We show the advantages of using Honeywell products (Production Balance, RPMS, Uniformance PHD, Uniformance Process Studio, Enraf, APS) in an integrated planning and accounting solution at the refinery. Special attention is paid to the design of a special mathematical model.

Online Migration of Experion R211.3 to R311.3, Khalid Al Khor, Dolphin Energy Limited
Dolphin Energy Limited is a JV between Occidental Petroleum, Total and Mubadala development company that is owned by the UAE government. Dolphin Energy produces and supplies natural gas from a dedicated section of Qatar’s North Field to customers in the UAE and Oman over a sub sea pipeline 370 km in length and 48 inches in diameter.

Recently, Dolphin Energy Limited in Qatar successfully completed the online migration of their Experion based Integrated Control System from R211.3 to R311.3. The Experion PKS system installed at this site has 9 redundant servers, 37 C200 controllers and many critical 3rd party interfaces through OPC/Modbus, including their ESD systems.

This presentation focuses on topics that will be of interest to others users of similar Experion systems:
- Main drivers for migration
- Business case approval for migration
- Migration planning
- Utilizing Honeywell standard processes and tools for migration
- Challenges before and during migration, and mitigation action plans
- Post-upgrade benefit audit – Operational, maintenance and engineering benefits
- Path forward actions for the next phase of R4xx migration.

Finding Needles in Haystacks: Control Performance Monitoring Tools, Techniques & Experiences, Fouad Al-Saif, Saudi Aramco
A significant installed base of regulatory and multivariable model predictive controllers exists in Saudi Aramco's extensive network of oil production facilities, refineries and gas processing plants. The company recognizes that these controllers, in many cases, do not operate at their true potential. It also realizes the need to enhance the utilization of facilities and identify inefficiencies to improve capacity, availability and yield. These challenges led to the selection of Honeywell’s Matrikon Control Performance Monitor (CPM) application for deployment across Aramco’s operating facilities, to assist in bridging the gap between the desired and actual performance of controllers.

This presentation will highlight Saudi Aramco's vision in standardizing on one control performance monitoring application and the approach taken in deploying it across Aramco's operating facilities. Also highlighted are Aramco’s strategy, experiences and benefits gained from utilizing Honeywell’s Matrikon CPM application to systematically measure, analyze and improve drivers of key operational metrics.

Details at: www.honeywellusersgroup.com

8/4/2011
The Challenges of Implementing a OneWireless Mesh Network covering an entire Process Unit to increase Operator Awareness, Jérôme Corbet, Total Gonfreville L'Orcher

Honeywell has successfully implemented a OneWireless Mesh Network covering Total's entire Polystyrene unit in Gonfreville L'Orcher. The objective is to allow operators to be aware of alarms active in the control room while in the field. To achieve this, some significant challenges had to be overcome:

- Achieving the required unit coverage was a critical requirement: A unit is a complex environment with many potential ‘dark zones’ for a wireless signal.
- The most suitable device able to operate in an ATEX environment had to be identified: Different devices could be selected to carry the alarms such as Tablet PCs and PDAs.
- It was vital to ensure that the operator in the field is aware of an active alarm in a noisy environment.

This presentation describes how Total and Honeywell successfully implemented the solution, taking into account the different requirements and other additional applications that Total is now addressing using the same Universal Wireless Mesh Network.

Major Refinery Expansion with Experion PKS: How to Coordinate several EPC Contractors Working for the same Objective, Cándido Cabañas, Cepsa

During the period 2006 - 2010, CEPSA carried out an important expansion of its Refinery La Rabida located in Huelva industrial park

The project was an important economical and organizational challenge for the company.

The Process Control and Safety Systems specified for the project were based on HONEYWELL EXPERION C300 and SAFETY MANAGER.

There are several aspects in the execution of this project which are worth highlighting:

- Five process areas, each one developed by a different engineering contractor, coordinated and supervised by CEPSA's own Engineering Dept.
- Development of a single database to centralize all the instrumentation data
- Software test for Control (FAT/SAT), Safety and DCS graphics were developed in the Refinery independently from the hardware test

The following goals were achieved:

- Good uniformity in data process, despite the fact of having different engineering contractors
- Site Acceptance Tests (SAT) and commissioning/start-up schedule was reduced optimizing the participation of Refinery personnel with a minimum cost for CEPSA

Market Trends that led Saipem to adopt an iMAC Approach for the Arzew LNG Project, Carmelo Passanante and Luigi Pedone, Saipem S.p.A.

Today's marketplace puts ever-increasing demands on end-users to increase production and to operate plants in an efficient, safe, and environmentally compliant mode. To achieve these business objectives, end-users need to have better visibility, knowledge, and control over their assets. They achieve this by expanding the automation layers supplied by the EPC from basic instrumentation and controls to Advanced Process Control, Operator Training Simulators, Manufacturing Execution Systems and Supply Chain optimization. As a result of the increasing demand from end-users to expand the automation layers of a process, EPCs have to deal with
increasing technology complexity and diverse resource skill-sets to deliver their projects, when considering their process design, project execution, and vendor selection processes.

Saipem has selected Honeywell to be the “Integrated Main Automation Contractor” (iMAC), for the Arzew LNG Liquefaction Project. Under this framework Honeywell is delivering the full automation scope for the Sonatrach Arzew plant including instrumentation, DCS, ESD, F&G (field), APC, OTS and MES. This approach minimizes the project risk by having one single contractor for the implementation of the automation solutions and by deploying state-of-the-art technology that is scalable and compatible throughout the automation layers.

In this session, Saipem will address the most common issues EPCs are facing today and how Saipem has tackled them by selecting the iMAC approach with Honeywell for the Arzew project. We will discuss the advantages of using this approach to reach the business objectives of project success (delivering on-time, on-schedule, on-budget, with less risk), operations & business readiness (smoother startup and reliable first year of operations), and business sustainability (asset safety, reliability, and efficiency) for the life-cycle of the facility. We will look at the automation layers that were selected, how these components fit together, and finally the benefits and challenges from such an implementation.

And more….