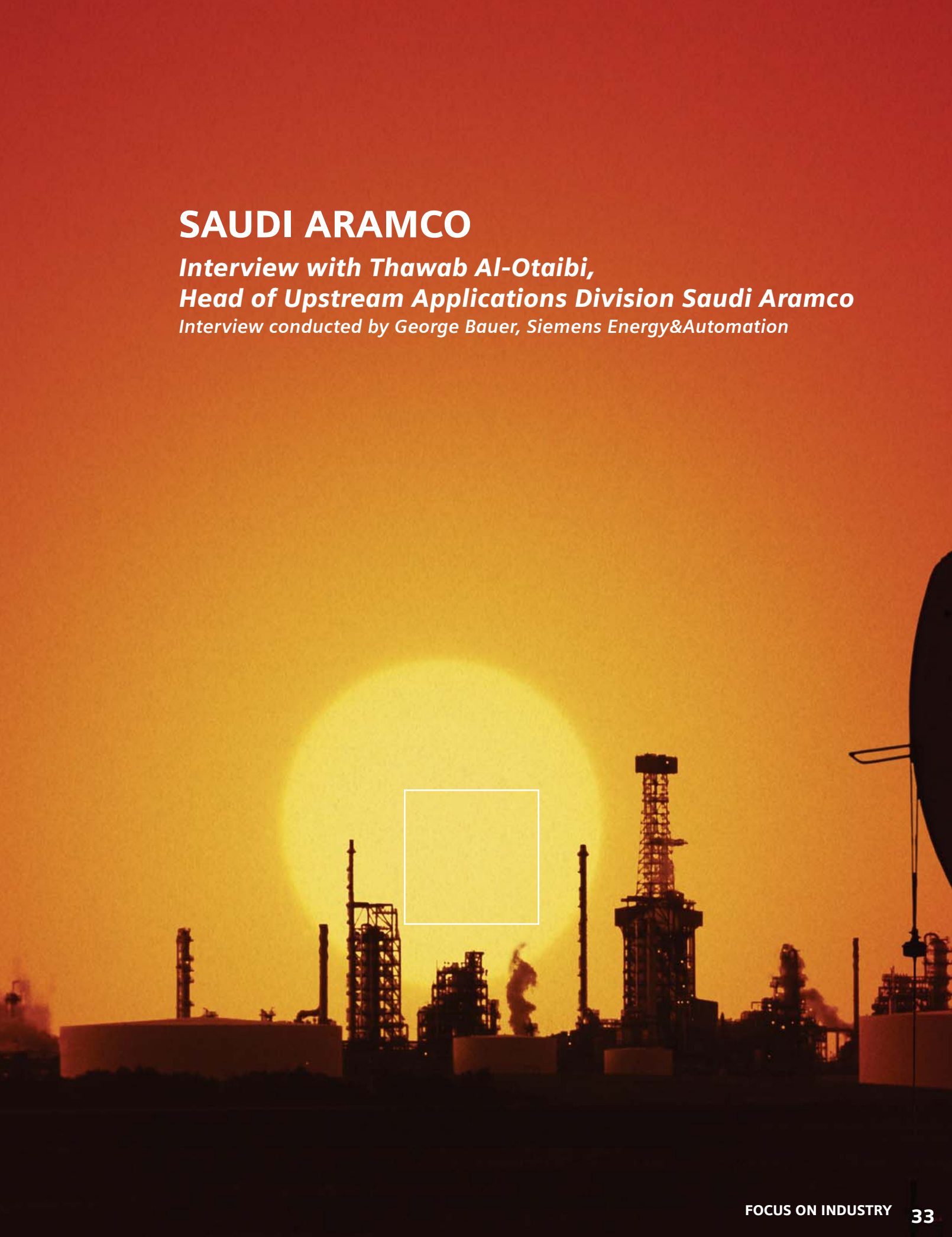


# SAUDI ARAMCO

*Interview with Thawab Al-Otaibi,  
Head of Upstream Applications Division Saudi Aramco*

*Interview conducted by George Bauer, Siemens Energy&Automation*



## **Thawab Al-Otaibi of Saudi Aramco describes how his team employed SIMATIC IT XHQ to deliver Saudi Aramco's Enterprise Monitoring Solution (EMS) ahead of time and under budget**

### **Could you provide some general background on the business and operations of Saudi Aramco?**

Saudi Aramco is the world leader in crude oil production. Saudi Aramco owns and operates an extensive network of refining and distribution facilities, and is responsible for the gas processing and transportation installations that fuel Saudi Arabia's industrial sector. An array of international subsidiaries and joint ventures, including one of the world's largest and newest fleet of supertankers, deliver crude oil and refined products to customers worldwide.

### **Could you give an overview of your implementation of Siemens Operations Intelligence?**

Saudi Aramco's objective in applying operations intelligence was to improve the responsiveness and efficiency of operations. Saudi Aramco selected SIMATIC IT XHQ as the platform for this enterprise monitoring strategy which it calls the Enterprise Monitoring Solution (EMS). The EMS solution has a considerable scope covering three different areas of operations including refining, gas operations, and oil operations.

Gas operations uses the EMS solutions within two of Saudi Aramco's gas processing plants that rank among the largest gas processing plants in the world. In refining, EMS is applied in all five of Saudi Aramco's domestic refineries. These refineries have a combined refining capability of approximately 1.4 million barrels per day. Finally, Saudi Aramco's Southern Area Oil Operations employs EMS to bring together information from 26 gas oil separation and water injection plants across the Ghawar oilfield, the world's largest oilfield.

### **Prior to the deployment of EMS, what were some of the common requests by your users with regard to operations information?**

We found that there were several recurring frustrations about information being voiced by our operations people. Operations supervisors and managers have widely expressed dissatisfaction from having to jump from island to island of information just to establish a complete picture of the state of operations. Operations personnel have been gaining an increasing set of responsibilities and duties and there simply wasn't enough time to collect all of the information needed to be completely effective in their duties. Conversely there was the complaint about being overwhelmed with raw data.

What they were seeking was a mechanism that would allow them to make decisions quickly and efficiently. In addition, many managers expressed that several of the KPIs that we had developed over the years were too abstract and not transparent. Quite often, the manner in which underlying operational measures were linked to a given KPI was not well understood. The result of this was that while managers might know that a KPI was off target, precisely what to do to correct it was not always clear.

### **What objectives led to the establishment of the EMS project?**

EMS was a next logical step in our strategy to promote the use of best practices and distribute decision making within operations. Saudi Aramco is committed to the development and implementation of best practices throughout its operations. We saw EMS as a vehicle to identify, capture, and replicate best practices within and across operating units. In addition, we recognized a need to empower operations personnel at the plant level. Our belief was that we could realize more timely, improved operational decisions if we could empower more decision makers at the plant level.

Naturally, in order for these decision makers to be effective, they must be presented with information combined from a variety of sources in a timely fashion. EMS was established to be the mechanism for building and delivering these live, integrated views for decision makers.

### **What was the idea behind applying operations intelligence across multiple business units?**

At Saudi Aramco we foresaw benefits from the application of operations intelligence not only within given business units but also across multiple business units. EMS solutions ultimately deliver highly aggregated management dashboards for senior business unit management. We felt that we could achieve more consistent management by a consistent presentation of the information. After all, the presentation of the information provides with it a context that helps the user to understand and fully comprehend the meaning of any information being presented. We recognized that certain measures are common across business units and should be consistently calculated and presented. With this common approach across business units, managers that rotate between business units can quickly get up to speed. In effect, we were engineering some of our best practices in management directly into the dashboards and views of the EMS solution.

**What would be an example of the typical kind of information found in one of the dashboards of an EMS solution?**

For example, in a refinery we might have a top level dashboard providing summary information on safety statistics, environmental measures, inventory levels of crude and products, electricity and fuel gas usage, key operational KPIs, production and utilization rates for major units, daily cost and margin information for the plant and maintenance summary information. As you can see, for someone such as a plant manager, this dashboard presents a wealth of information gleaned from a variety of sources.

The fact that all of this information is presented within a single, coherent view in real-time, enables the plant manager to see the current health of operations at a glance. Of course, these are all highly aggregated summaries however, if something is out of step, in a single click the summary view can be drilled into and disaggregated to investigate the underlying issues.

**How would you describe the EMS user community?**

The EMS user community is actually quite diverse. EMS was designed to be a solution for many different levels of personnel within many different functional areas of operations.

For example, in a typical facility we have content geared to hands-on people working in operations, maintenance, engineering and quality control. In addition, we have a series of dashboards for supervisors and managers within the facility as well as at the business unit level. Of course, these different roles are each delivered views that are specifically designed to support the decisions for which they are responsible.

**Is there any benefit in having so many different users served by a single solution?**

Even though EMS serves the information needs of many different roles, the important point is that these various roles and the views they engage are all drawing information from the same core solution. Although they are focused on different levels of detail or with different perspectives on operations, the foundation for their decisions is the same EMS solution, representing a "single version of the truth." By uniting users around a common representation of the state of operations we are helping to both align their efforts with the goals of the business and provide the basis for collaboration.

**What are some of the data sources that are brought together within the EMS solution?**

SAP R/3 is used throughout Saudi Aramco and therefore this is a key source of HR, maintenance, and costing data for the EMS solution. In addition, we connect to our OSI PI historians for both real-time and historized process data. For product quality information the EMS solution is linked to a variety of laboratory information management systems (LIMS) for the EMS solution.

Even though many different LIMS systems are used in Saudi Aramco users get the quality information from these systems presented in a uniform fashion. Also we connect our Documentum document management system to EMS as well as a number of legacy applications and custom databases for preventive maintenance, environmental and safety data.

**How are you bringing together business and operational information in EMS?**

We believe that the bridging of business and operational data is the



key to realizing the full potential of a solution such as EMS. More specifically, when operational data can be related to business data, the state of operations can be shown in its full business context.

For example, production in a unit can be at a high level but if that production is not matched to the specification of what is actually needed by the business then that "high" level of production may not be as valuable to the business as you might first expect. This is a very simple case, but manufacturing is full of examples where it is almost impossible to make a judgment on what is best for the business without the "big picture" view of the business.

One place we are adding business context in EMS is with some of our operational KPIs. Rather than simply basing these KPIs on a set of process oriented measures, we are tying these KPIs to a lower level full costing model. This monetary model helps users to understand the KPI's relative impact on the business, rather than just an abstract measurement. Another place we are applying cost to operational information is in the area of maintenance work orders.

#### ***How are you making use of the SIMATIC IT XHQ alert notification capability in the EMS solution?***

Managers and engineers are increasingly asking for mechanisms that enable them to manage by exception. With the SIMATIC IT XHQ alert notification system, we can provide users with customizable limits against specific measures within EMS. If this limit is crossed, a message can be sent via email or cell phone to the appropriate person.

Therefore a slip in production level or excursion of an environmental measure could trigger such a notification and engage the appropriate people for corrective action. As we go forward, we see alerts such as these being used to trigger early warnings of potential problems, enabling a more proactive approach.

#### ***How is EMS changing the work culture at your facilities?***

One effect has been a change in how transparency and visibility into operations is regarded by our users. There is always a bit of apprehension when people realize that their management will have immediate visibility into all aspects of their operations. However, what we found was that this initial apprehension was replaced by a collaborative, problem-solving culture. Problems are now surfaced right away and people are immediately engaging in finding solutions to these problems. This collaboration has actually helped to drive new decision processes in operations.

Another change we are seeing at the plant level is a shift from a reactive culture to a more proactive management of operations. There are many examples of this from throughout operations but perhaps the best example is in maintenance, where we have focused on the reduction of break-in maintenance jobs that result

in unplanned outages. Tracking the open preventative maintenance work orders and raising the visibility of work orders critical to current operations, gives maintenance personnel an improved focus on what maintenance issues are critical to the business. This visibility of maintenance issues across the facility also enables maintenance management to better balance their resources.

#### ***What were the key factors in selecting Siemens as a provider of EMS?***

Of course one consideration was the strong position of Siemens in the world market, and the well-established presence of Siemens in Saudi Arabia. However, another critical factor for Saudi Aramco was the number of successful references in implementing intelligence solutions throughout the industry. We saw this as an important indication that Siemens had experience in applying operations intelligence into solutions that were relevant to our business.

#### ***How would you characterize the EMS project implementation?***

The EMS project was an unprecedented success. To begin with, the idea of combining so many diverse sources into real-time views was relatively uncharted territory. In addition, the scope of delivering such a solution to over 32 sites across three different business units represented a rather ambitious goal.

Furthermore, our team at Saudi Aramco had no previous experience in working with the SIMATIC IT XHQ product. Nevertheless, the joint Saudi Aramco-Siemens team was able to deliver a solution ahead of the allotted time and under the proposed budget. In fact, we even expanded the original scope of the project to include some requests from our users for the conversion of process graphics from legacy systems.

#### ***Were there any particular methodologies that contributed to the success of the EMS implementation?***

A fundamental concept from the beginning of the EMS project was to orient the solution around key roles within operations. Unlike so many IT projects that tend to focus on data or on a specific application, EMS had the users as the focal point. Because of this approach, the first step of the project was to conduct interviews of users in the roles that we wanted to serve. This helped us establish not only what data would be required to address their information needs, but also to understand the way in which our users wanted to consume the information.

This meant knowing how they wanted information to be related and summarized and how our users sought greater details supporting key information. These all became important aspects of the views and dashboards delivered within EMS and were keys to the usability and ultimate success of the deployed solution.

**Were there any particular features of the SIMATIC IT XHQ platform that you leveraged in EMS?**

One important feature in the SIMATIC IT XHQ platform that the EMS project relied heavily upon was the reusability and object-oriented nature of the view components. On the EMS project, we combined this central aspect of the platform with a methodology that identified commonalities across business units and across types of sites. By using this approach, the project team was able to develop, at the beginning of the project, a set of view components that became reusable building blocks across all business units and within categories of sites, such as refineries, gas plants, etc.

As the EMS project moved on to additional sites in the deployment plan, a large portion of the configuration effort for the site was already implemented in these reusable building blocks. This meant that the incremental effort involved for a new site was limited to the content specific to the new site. While this reuse feature contributed to the decreased cost and time for deployment, it was also an important mechanism for insuring the uniformity of the EMS solutions. Because these reusable view components contain not only display details but also aggregation and navigation informa-

tion, they became a key mechanism for enforcing consistent presentation and behavior through the solution. For example, a tank component in EMS is identical no matter what site or business unit a user examines. The graphical presentation, aggregation of values, animation, drill-down behavior, etc. is the same throughout all the EMS solutions. As a result, the context framing the data associated with a tank is consistent regardless of the business unit at which you are looking.

**With the successful roll-out of the EMS system, what are the challenges going forward?**

Ultimately, in order to fully exploit the capabilities of an intelligence solution such as EMS, the solution must become integrated in the daily activities of everyone in operations. Some of the really exciting changes that we are beginning to see around collaboration and a more proactive approach to the business require an evolution of the work culture within the plant. Of course, changes in the work culture often take longer than we might like to see them happen. One thing that has helped to accelerate this process however, is the enthusiastic support of EMS by senior management at both the business unit and site level.

