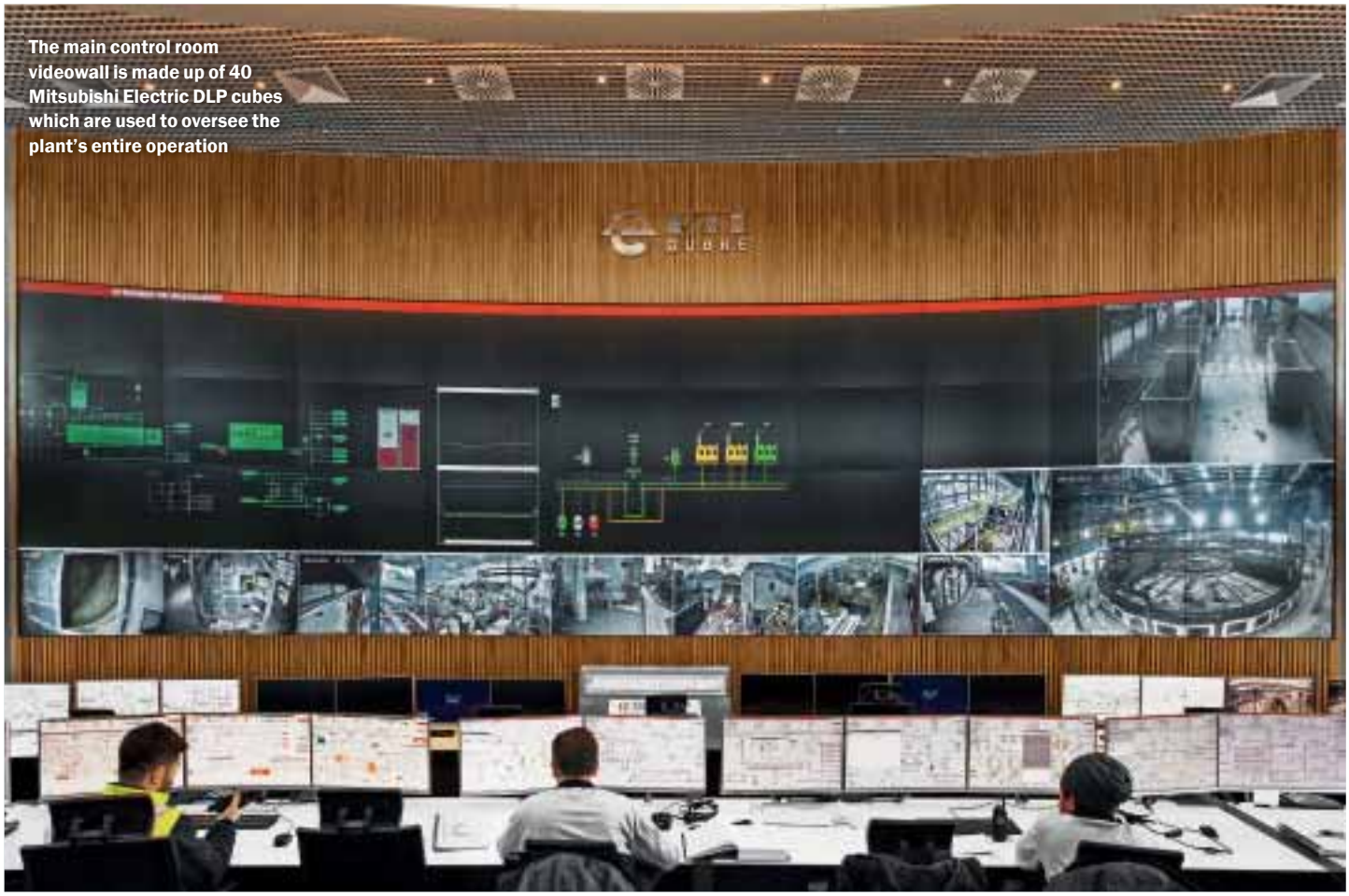
# Mission critical

Technology is helping deliver the big picture to operators at a large fertiliser and recovery plant in Turkey. *Zoe Mutter* looks at which innovations are offering factory management teams in the control tower a view of processes and alerting them to any problems in realtime.



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The facilities have contributed $620 million to the national economy since their construction

» At the centre of the gargantuan Eti Bakır Mazıdağı fertiliser and metal recovery plant in Mardin, Turkey, there is a powerful control room of equally epic proportions monitoring operations. Spread over 1.58 million square metres, the five factories and 12 auxiliary units making up the facility are responsible for producing 20 per cent of Turkey's mineral fertiliser.

As the country is self-sufficient in food production, agriculture is crucial to the national and local economies, as is the state-of-the-art fertiliser plant. But prior to its construction high demand for mineral fertilisers had led to increased costs and reliance on imported products. This changed in 2011, when the Mazıdağı district of Mardin Province came under the ownership of construction firm Cengiz Insaat which invested €1.1bn to »

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transform Eti Bakir.

Cengiz CEO, Ömer Mafa, comments on the largest private sector investment in the Eastern and Southeastern Anatolia regions: "We constructed the facilities in a very short time - it was a three-year process which saw five thousand people involved in completing the project. This not only helped reduce the unemployment level in the region, the integrated facilities have since contributed $620 million a year to the national economy."

## A powerful means of monitoring

To monitor the vast number of operations carried out across the facility it was necessary to centralise all process control functions. This was achieved by building a tower which would house the main control room on the eighth floor. Smaller control rooms handling individual factories and functions such as power and steam generation plants are spread across six other floors.

To help complete the complex project, CCC Command and Control Centers AS was selected as systems integrator. Integrator Akare then managed all Panasonic security camera integration, access control systems, fire detection and alarm systems as well as emergency announcement systems. Conceptual architectural designer and consultant TTGorsel created the look of the tower while Aysis Automation was responsible for the SCADA IP network and CCTV network architecture of whole facility.

The lynchpin of the main control room is a videowall made up of 40 Mitsubishi Electric 72WE120 72in DLP cubes which is used to oversee the plant's entire operation. LCD videowalls comprising Mitsubishi Electric LM55 55in displays in a 3 x 2 configuration can be found in the other smaller control rooms, monitoring specific aspects of the facility's operations.

The videowall needed to be robust and deliver the big picture to all operators, offering direct access to any of 450 cameras at one time. This process is helped by the air-cooled projectors in the cubes which do not require any routine maintenance.

Metin Kantarcioglu, business development manager for Mitsubishi Electric Turkey VIS division, highlights another important development that should improve performance at the plant further: "It is difficult to read thousands of sensors at a single time across the facility so Aysis is creating an interface which collects data from different SCADA systems and combines all dashboards in a single large page which can be only displayed on this size of videowall system." »

**Communication between each site is critical and by using AV technology all factory management teams in the control tower can see each other's processes**

Other key AV equipment selected for the high-profile project includes Matrox IP KVM, Panasonic ONVIF cameras, Shuttle PCs, deployed as the videowall controller hardware, and solutions from SCADA vendors Siemens, Emerson and Outotec.

## Centralised control

Powerful control solutions were essential to manage the vast volume of live data, CCTV camera feeds and the 100 individual videowall displays located across the site. Therefore, an IP-based system capable of handling complex customer requirements and coping with the distance between some facilities and the central control room was selected. Such a complex system would have been difficult to achieve using an analogue infrastructure.

A native IP-based system was created using the Display Agent, Multicast Converter, Application Server, S-SF Control and S-SF Master components of Mitsubishi Electric's S-SF suite. This handled data traffic from any networked source device - from sensors and image processors through to CCTV cameras and data stores - and could synchronise and share content across multiple locations with minimal latency. This facility was one of the first projects to feature the S-SF Native IP videowall controller system.

An S-SF system featuring 80 application servers, 33 display agents and 10 S-SF controllers linked together over a single network manages all control tower videowalls. High performance and redundancy is achieved by sharing processing load dynamically across the system. If any of the PC nodes encounter an issue the network compensates by reassigning resources automatically.

"The plant is huge and every factory is critical in the production chain," says Kantarcioglu. "Any failure in one factory can cause big issues in all other factories, putting a stop to tanks, turbines and of course money. Communication between each site is critical and by using AV technology all factory management teams working in the control tower can see each other's processes and be made aware of any problems in realtime."

**"With the help of secure AV the facility can be monitored from other sites and content can be shared with the headquarters in Istanbul."**
**Metin Kantarcioglu**
Business development manager, Mitsubishi Electric Turkey, VIS Division

## Security and software

For maximum security, each of the factories and systems - which are connected on a single physical IP network - are isolated using independent VLAN (virtual large area networks). An overview of the entire system is still possible however as the sub-VLANs have access to the main control room display VLAN, meaning operators in the main control room can view the sub-systems' data and content.

The versatility and scalability of the S-SF system came into play, especially when interfacing the individual VLANs and attaining the required frame rates and latency across the sizeable and complicated network. Remote access of every asset making up the network has been invaluable, making it possible to improve energy efficiency by automatically turning off videowalls that are not required outside of office hours.

Harmonising different VLANs and displaying on a single videowall VLAN was one of the main challenges highlighted by Kantarcioglu: "Although there is one big network, due to security reasons each factory and also CCTV demanded different and isolated VLAN structures. Carrying the signals through the IP, adjusting the proper frame rates and maintaining the high quality was also important. Flexibility of the S-SF suite helped overcome such issues when working with such a complex systems.

"The IP based S-SF system avoided us having to deal with kilometres of fibre cables within the tower. Everything is based around Ethernet cabling so it's much easier to distribute a single source to all displays inside the AV network and the S-SF also allows control operators to open any source on their desktop directly."

Designed for native IP network-based command and control display architectures, the S-SF software suite enables network-based display systems to operate with great scalability and makes it possible to adapt more easily to future developments.

## A future proofed facility

Now the plant is operating at full capacity, it is producing around $350 million of fertiliser and $270 million dollars of cobalt, zinc and copper, boosting the economy and reducing unemployment levels. It is hoped the facility will be a pioneer in increasing investments in integrated industrial investments in the country.

Flexible visual systems were a necessity and now mean the facility can develop further. With the versatile innovations in place any source from several kilometres away can be transferred to the AV system easily through the IP based solution.

"Cengiz is a continuous investor," Kantarcioglu adds. "With the help of secure AV they can monitor the facility from other sites and share content with the HQ in Istanbul so decision makers have an online remote eye on their investments." ■

## CONTACTS

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