

## Eti Bakır Mazıdağı, Turkey



Covering 1.58 million square meters and incorporating five factories and 12 auxiliary units, the Eti Bakır Mazıdağı fertiliser and metal recovery plant in Mardin, Turkey is a colossal installation. At its heart, Mitsubishi Electric video wall keeps a watchful eye over operations.

### PROJECT LOCATION

Turkey

### CUSTOMER

Eti Bakır Mazıdağı

### APPLICATIONS

Fertiliser and Metal recovery plant

### PRODUCTS USED

40 x VS-72WE120  
36x LM55P2A

### INSTALLATION

Command and Control Centers AS

### CONCEPTUAL DESIGN

TTGorsel

### FURTHER INFORMATION

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## BACKGROUND

In spite of its rapid industrialisation in recent decades, agriculture is still a vitally important part of the Turkish economy. Turkey is one of the few countries in the world to remain self-sufficient in food production. Among many other products, it is the world's leading exporter of hazelnuts, figs, apricots and raisins, and the fourth largest producer of fresh vegetables and grapes. For many years, high demand for mineral fertilisers had outstripped domestic production, meaning a reliance on imported products and increased costs. In 2011, the Mazıdağı came under the ownership of Cengiz Insaat, one of Turkey's largest infrastructure construction firms. Following an astounding €1.1bn investment and a rapid modernisation programme, Eti Bakir was transformed in just three years into a state-of-the-art facility that now produces 20% of Turkey's mineral fertiliser needs.



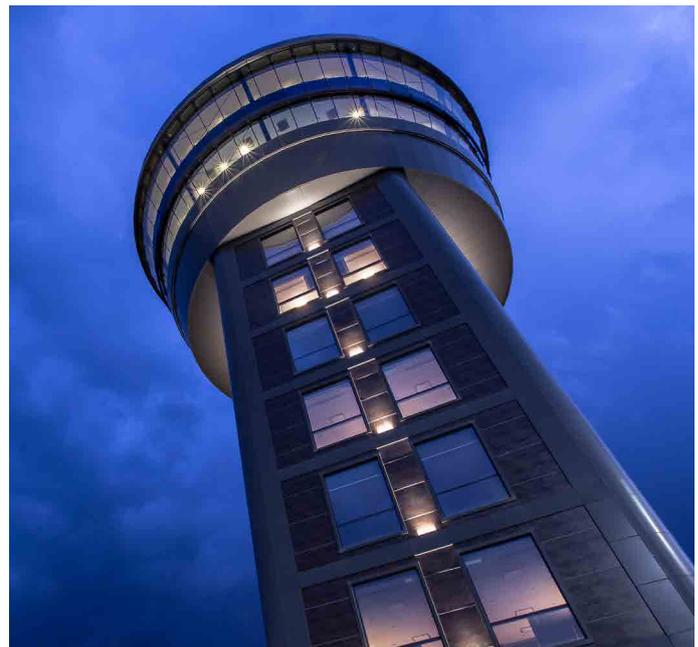
The operations at Eti Bakir are spread over a wide area, with some of the factory facilities several kilometres away from the central control room. Due to the distances involved and the sheer complexity of the customer requirements, a fully IP-based system was the only practical solution.

Mitsubishi Electric's S-SF suite provided a powerful and versatile answer to the challenges of this extremely complex project. The five components of the suite, Display Agent, Multicast Converter, Application Server, S-SF Control and S-SF Master. Work together to create a native IP-based system capable of handling data traffic from any networked source device, such as sensors, image processors, CCTV cameras or data stores, synchronizing and sharing content instantly across any number of locations with minimal latency.



## PROBLEM & SOLUTION

With multiple operations based on the site, it was decided to centralise all the process control functions into a purpose-built tower. The main control room facility is located on the eighth floor of the tower, with other smaller control rooms for the individual factories and supporting functions, such as power and steam generation plants, located across a further six floors. Centrepiece of the main control room facility is a Mitsubishi Electric video wall consisting of 40 72WE120 72" DLP cubes. The control rooms on the other six floors are equipped with LCD video walls comprised of Mitsubishi Electric LM55 55" displays in a 3 x 2 configuration. In total there are nearly 100 individual video wall displays throughout the facility, all of which need to be centrally managed. While the LCD video walls monitor specific aspects of the plant's operations, the main control room screen needs to provide oversight of the entire operation. Managing the huge volume of live data and CCTV camera feeds was a technically demanding challenge requiring the use of the very latest screen control technologies.





At Eti Bakir, all control tower video walls are managed by a S-SF system consisting of 80 application servers, 33 display agents and 10 S-SF controllers linked together over a single network. Each node on the system is either a PC or Intel™ NUC, with the processing load shared dynamically across the entire system to deliver optimum performance and maximum redundancy. Should an individual node suffer a problem, the network re-assigns resources automatically to compensate, ensuring very high reliability.

Although connected on a single physical IP network, each of the individual factories and systems such as CCTV are isolated from each other via independent VLANs (virtual large area networks) for security purposes. However these sub-VLANs remain accessible to the main control room display VLAN, enabling it to have complete oversight over the entire system. Operators in the main control room are able to drill-down to access detailed data and content from any of the sub-systems under its overall control.

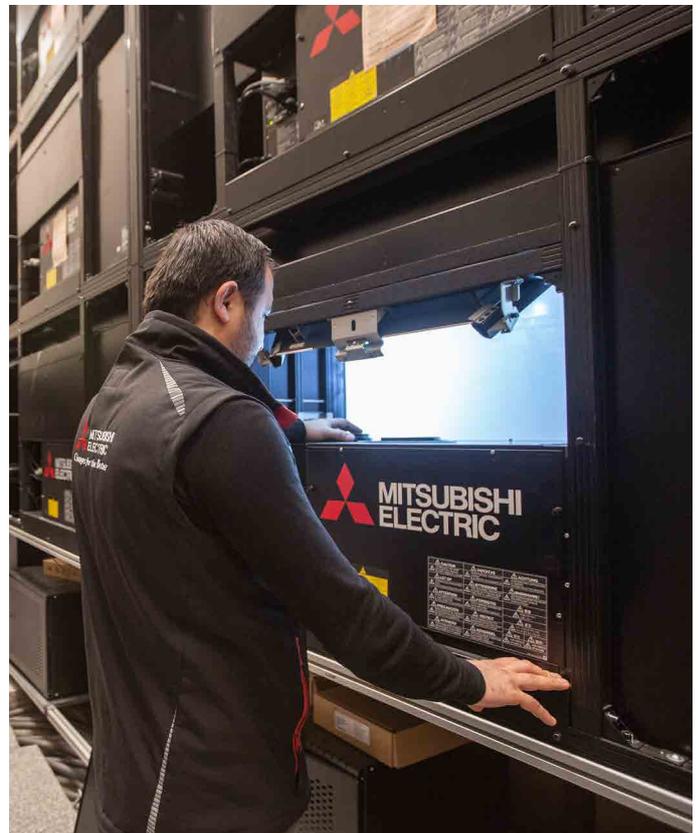
## INSTALLATION RESULTS

Interfacing the individual VLANs and achieving satisfactory frame rates and latency across such a large and complex network proved a considerable technical challenge for Mitsubishi Electric's engineers. Nevertheless, the versatility of the S-SF system ensured the commissioning proceeded smoothly and was completed on time. Moreover, the ability for operators to remotely access and manage every asset via the S-SF network has proved extremely useful. For example, video walls in management areas which are not required outside of office hours are turned off automatically to improve energy efficiency and screen longevity. A further benefit of the S-SF system is its inherent versatility and scalability, enabling it to cope easily with any future enhancements which may be required.

## Specifications

<b>Model</b>	VS-72WE120
<b>Technology</b>	LED video wall cube
<b>Overall Size</b>	59,9 m <sup>2</sup>
<b>No. of Modules</b>	40
<b>Cooling system</b>	Air cooling system with efficient cooling pipe and aluminum plate (No liquid)
<b>Type</b>	DLP™ technology (0.96" DLP™ 1 chip), DarkChip3™, BrilliantColor™
<b>Resolution</b>	WUXGA, 1920 x 1200 pixels (per module)
<b>Light Source</b>	Redundant LED (RGB)
<b>Light Source Service Life</b>	≤ 130,000 hrs.
<b>Brightness</b>	860 cd/m <sup>2</sup> bright mode 610 cd/m <sup>2</sup> normal mode 410 cd/m <sup>2</sup> eco mode 150 cd/m <sup>2</sup> advanced eco mode
<b>Contrast Ratio</b>	1500: 1
<b>Power Consumption</b>	77 W in advanced eco mode 97 W in eco mode 137 W in normal mode 225 W in bright mode

DLP™ and Digital Light Processing are trademarks of Texas Instruments.



## CUSTOMER REACTION

Eti Bakır Mazıdağı came fully online in the final quarter of 2018, and has made an immediate impact on both the national and local economies. Emre Kayışoğlu, General Manager of Metal Recycling and Integrated Fertilizer Facilities, commented in the media that along with the 5,000 workers that took part in the 3 year construction project, the facility will provide direct employment for 1,250 local people and indirect employment for a further 5,000, providing a much needed boost for the local economy. Overall it's estimated that 25,000 people will benefit from the plant's operations.

Ömer Mafa, CEO of owners Cengiz, noted in an interview that the plant represented, "The largest private sector investment in the eastern and south eastern Anatolia regions," and the major contribution the plant will make to the economy: "When fully operational, the plant will meet \$350m of fertiliser needs annually, while at the same time producing \$270m of cobalt, zinc and copper annually. Overall, Mafa estimated the plant will contribute \$620m annually to the national economy



## S-SF SOFTWARE FROM MITSUBISHI ELECTRIC

Designed for native IP network-based command and control display architectures, the [S-SF software suite](#) enables network-based display systems to operate more efficiently and with greater scalability. The versatility of native IP command & control visualization networks allow systems to adapt easily to future needs and allows the long-term cost benefits derived from the exceptionally long operating lifetimes of Mitsubishi Electric DLP and LED displays to be fully realized.

Using the S-SF architecture, control room video walls no longer require a dedicated display wall processor. Fault tolerance is assured due to the multiple redundancies inherent in the distributed network architecture. If one network node develops a fault, its role is instantly assigned to another node to achieve a completely seamless fail-safe response and guaranteed 24/7, zero-downtime performance. The S-SF system hardware is based on standard, widely-available network components, thereby removing the need to develop and debug proprietary hardware or operating systems. The result is a more reliable, cost-efficient system.

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