AIR TRAFFIC TECHNOLOGY INTERNATIONAL 2018

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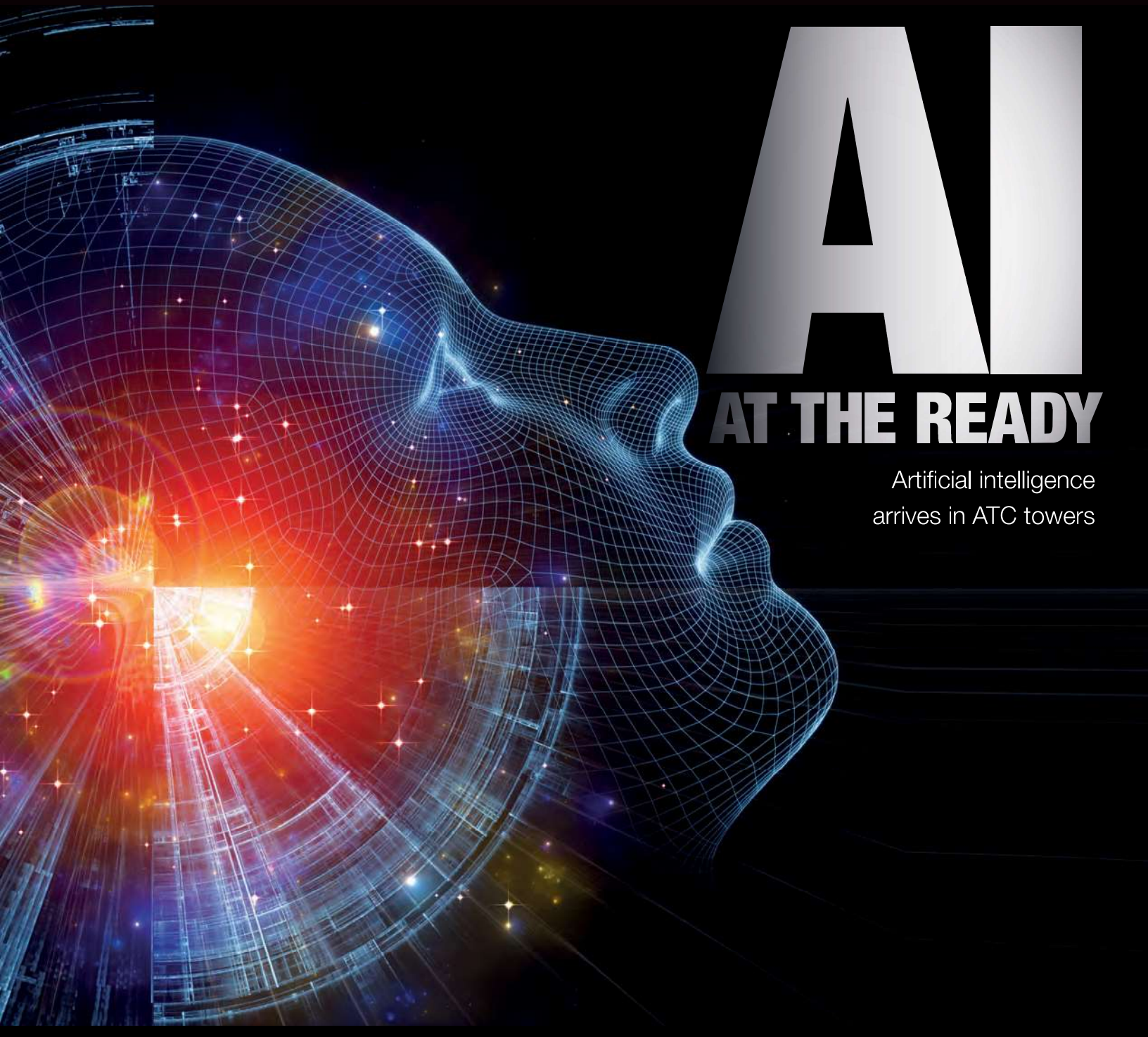


AI AT THE READY

Artificial intelligence arrives in ATC towers

SPACE RACE

Industry calls for more control over space traffic and high-altitude drones

4D FUTURES

How to predict the cost and benefits of the next stage of ATC operations

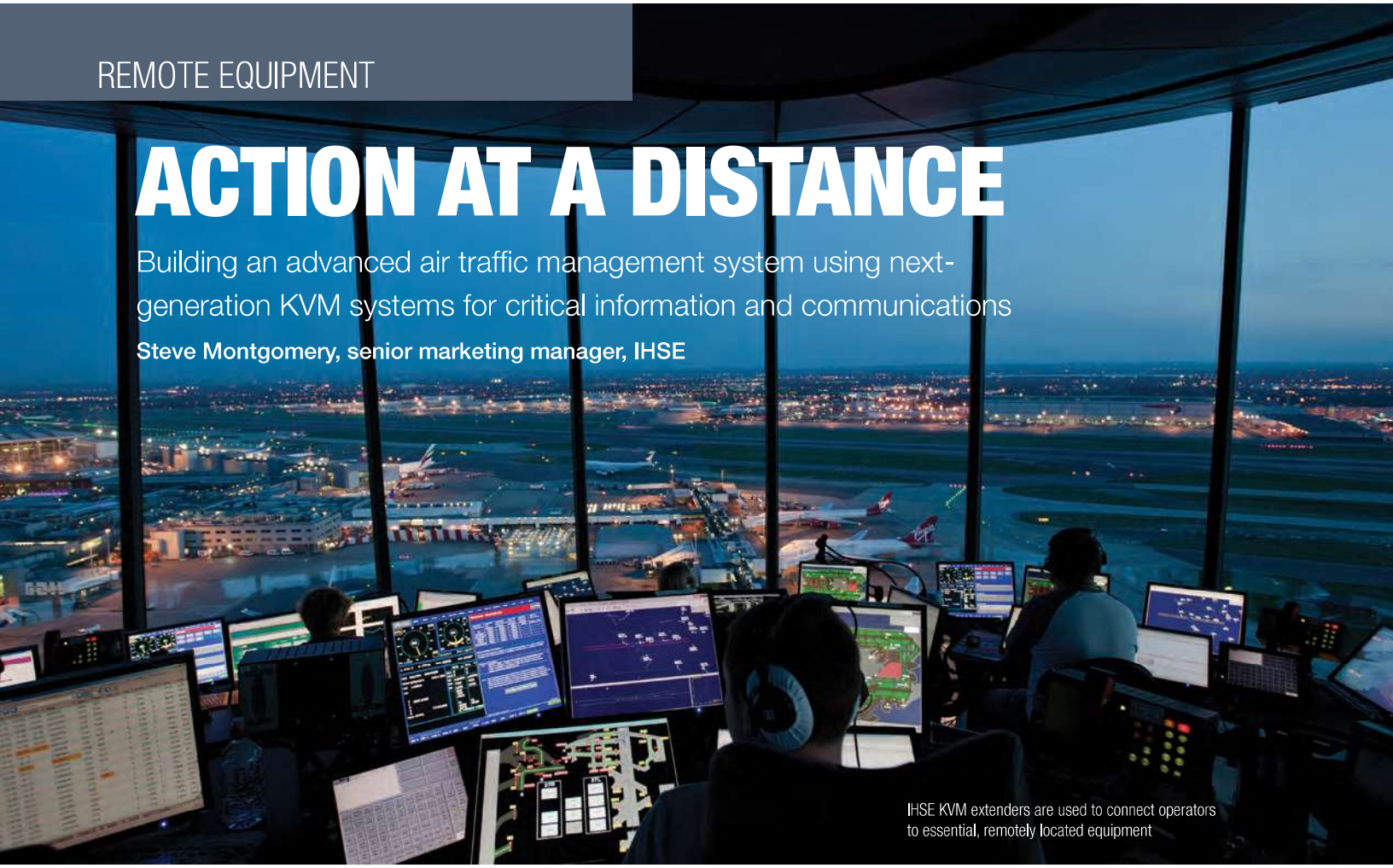
PRECISION FLYING

The FAA's flight interval management tests produce landmark results

ACTION AT A DISTANCE

Building an advanced air traffic management system using next-generation KVM systems for critical information and communications

Steve Montgomery, senior marketing manager, IHSE



IHSE KVM extenders are used to connect operators to essential, remotely located equipment

Control towers and other ATC facilities are still being designed with computer equipment close to controllers. This co-location of noisy, heavy, heat-generating computing devices near to operators is no longer a necessary situation in any tower or indeed in most airport operations centers. Computing devices are far better managed in a secure, environmentally controlled and centralized location, where IT staff have immediate access and can maintain them without distracting operators.

That equipment still needs to be connected to operators' workstations. The most reliable and effective way to achieve this is by extending the interface between them using KVM (keyboard, video and mouse) extenders. The extender, which is actually a pair of devices, serves to transmit uncorrupted video, audio, and keyboard and mouse (or other pointing device) commands between the operators in the tower and their equipment down below.

On-screen images must not be corrupted in any way by artifacts inserted into the processing chain, so the transmission infrastructure must be able to handle the high bandwidth requirements of the highest performing displays. Nowadays that quality is achievable through advanced compression algorithms that ensure that no image degradation is encountered on the best and most modern displays.

Ultimate reliability and continuous operation

It is essential that data transmission within ATC operations is totally reliable. KVM technology supports this through the integration of redundancy and failsafe systems. In addition to secondary power supplies, individual KVM devices are available that have multiple internal circuits and intelligent link monitoring. Should the main connection in either device fail, or the cable between them be compromised, an automatic circuit within the extenders instantly switches to the backup connection.

Modernizing ATM facilities

In a traditional ATC environment, operators rely on several independent systems, each with a dedicated interface device and screen. Multiscreen control capability in KVM systems enables the management of multiple systems using a single keyboard and mouse. Switching is automatic and as the operator changes focus occurs simply by rolling the mouse cursor over another screen. This reduces desktop clutter and operator confusion, as well as creating a superior workflow.

With the right KVM system in place, air traffic can be managed from any location, whether local or remote. Data and communications equipment can even be sited at a distant airport or operations center and data transmitted over long distances to local operators.

The technology not only provides controllers with uninhibited access to all necessary systems on their workstations, but supervisory staff can access the same devices to oversee operations and, if necessary, take control. With simple keyboard commands the supervisor can easily switch between operators to maintain a full overview of all activities in a live environment. A complete workstation can even be replicated simply and easily, and passive backup locations can be constructed and turned live in a fraction of a second should the need arise.

The concept is applied to the expansion at King Abdulaziz International Airport in Jeddah, Saudi Arabia. A redundant KVM switch matrix has been installed in the existing tower and linked direct to the new ATC tower 3km (2 miles) away. Operators can manage air traffic from either location.

Security in the ATC environment

With today's increasing threats to network systems, resilience to cyber attack is paramount. The whole system must be protected against the risk of attack and exploitation of vulnerabilities. Direct-

Above: KVM extenders connect controllers at the top of the tower to computers in the equipment room at ground level
Inset: IHSE KVM technology transports real-time data throughout the entire air traffic control and management process, enhancing safety and operational efficiency from take-off to landing and beyond

connect KVM concepts reduce the ability of external cyberattack and the need for assigned firewalls like those required by network-based KVM solutions.

Beyond ATM

KVM systems are used in other air industry applications. The NATO Combined Air Operations Centre (CAOC) relies on advanced KVM switches as it serves to protect European airspace from airborne threats. The flexibility of the KVM switches installed in the center allows the duty commander to act immediately to choose and implement the most appropriate response configuration to meet the perceived threat.

At Frankfurt Airport, the Airside Coordination and Data Centre (ACDC) is responsible for the analysis, processing and coordination of central flight information for ground and airport surface traffic control. This is achieved with the support of a large KVM matrix switch that provides instant and highly flexible connection between operational staff and computers in a remote IT center. Another system is deployed to train apron controllers in a variety of scenarios using high-resolution simulators and large screens fed by images selected and transmitted through a KVM switch.

In other airport installations around the world, KVM switches are used to assist with baggage handling and inform and entertain passengers through terminal information screens and digital signage.

Future proofing

KVM extenders and switches include extensive features, functionality and performance that make them ideally suited to many applications across the whole air industry. As Manuel Greisinger, head of sales at IHSE points out, "KVM technology is well proved in the ATC, ATM and airport operation sectors. The pace of development of KVM devices and IHSE's commitment to add dedicated industry-specific features means that this technology can be deployed with confidence in its performance and in the knowledge that future requirements can be met – often through simple and quick changeover of individual components." ❖