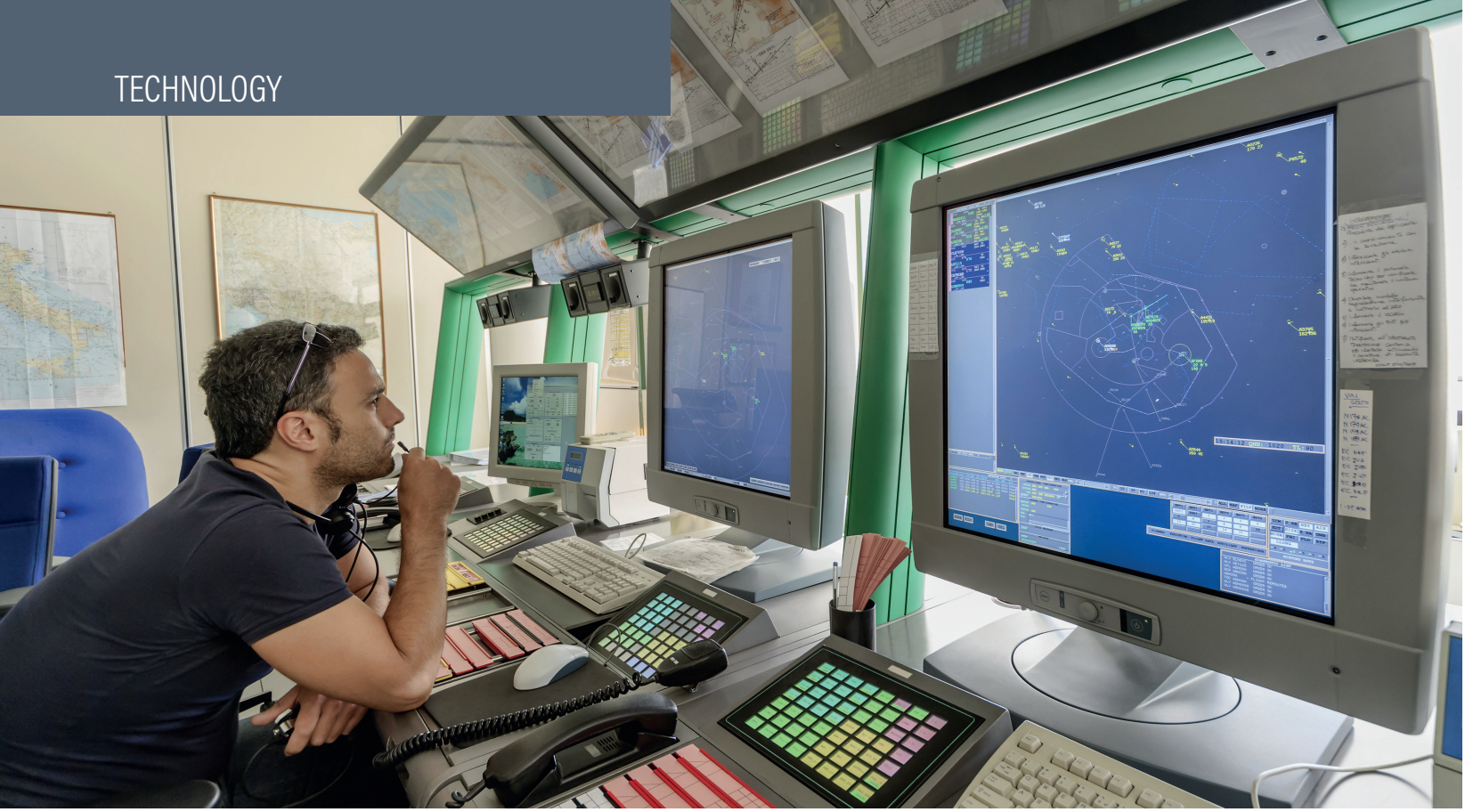


OPTIMIZING WORKFLOWS WITH REMOTE ACCESS TECHNOLOGY

Increased redundancy and efficiency are just two of the benefits of moving computing resources away from operator workstations

John Hickey, senior director of R&D and KVM systems for the Black Box Technology Product Solutions business unit

Keyboard, video, and mouse technology gives users the capability to move computing resources away from operator workstations and to establish remote access to those resources, whether they are located elsewhere in the same building, across a campus, or even in a different city.

This capability is useful not only for improving ergonomics and reducing desktop clutter at the controller's or operator's work-position, but also for eliminating heat, noise, and power requirements in the work area. By shifting mission critical computing resources out of work areas, KVM technology also can add a greater element of security, and support more robust redundancy.

In one form or another, keyboard, video, and mouse (KVM) technology has been leveraged in air traffic control (ATC) towers for the past 15 or 20 years. The traditional model incorporated KVM technology to facilitate point-to-point extension, where one receiver connects to one physical computer to enable remote access. Over the past several years deployment in ATC applications has migrated towards allowing for more flexible work environments and to build in more redundancy.

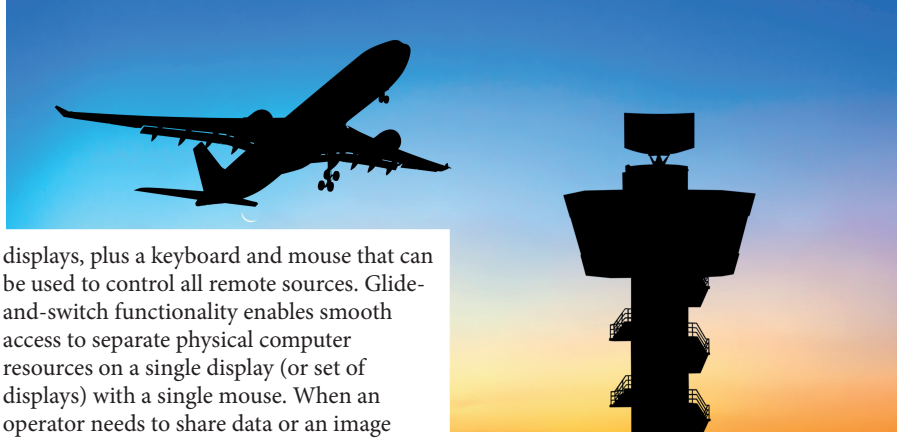
KVM technology has grown popular as a solution for airport operations because of its inherent scalability and cost advantages. Modern KVM technology integrates smoothly into IP infrastructure and interoperates seamlessly with standard administrative tools such as the active directory used for centralized authentication, or the smart cards that often are substituted for usernames and password. The technology is used across airports in many different ways, from check-in, baggage handling, and information kiosks to controller working positions (CWP) within the ATC tower or other monitoring and control facilities.

Reducing cost and complexity

In ATC and air traffic management (ATM), air traffic controllers require absolute concentration as they manage the flow of aircraft landing and taking off, and it is critical that the CWP be designed so that operators can be as efficient as possible, with the likelihood of errors minimized.

In a typical tower configuration, KVM switching and extension will allow each operator to look at multiple systems, both on desktop displays and on video walls. Sources might include ATM and scheduling systems, ground control management systems, ground transportation systems, radar tracking and weather systems.

The operator's workspace typically includes one or more high-resolution



displays, plus a keyboard and mouse that can be used to control all remote sources. Glide-and-switch functionality enables smooth access to separate physical computer resources on a single display (or set of displays) with a single mouse. When an operator needs to share data or an image with the whole control room or another operator, push-and-get functionality enabled by the KVM system allows that resource to be pushed up onto a video wall or pulled down from a video wall to a particular operator station.

Above: Today KVM technology is used across airports from check-in, baggage handling, and information kiosks to CWP within the ATC tower or other monitoring and control facilities.

Left: One of the next advances for KVM technology is the virtual tower, which replaces the physical tower at the airport with a control room that might be hundreds of miles away.

Boosting resilience and redundancy

A sophisticated KVM system can support pooling, where an operator connects to a pool of similar resources, instead of a single computing resource, as they are available. This ensures that even if the system in use fails, the operator can immediately switch to an alternate computer and continue working.

By enabling access to computing resources not just from the tower, but also from other facilities, KVM technology adds further redundancy to ATC operations. Because operators can easily share resources across buildings or sites, the monitoring team in another building can see what controllers are doing in the tower, and even control specific systems if the need arises. With the ability to record tower operations, it also becomes easier to train controllers and optimize the overall tower workflow.

Enabling ATC's future

One of the next advances for KVM in airport operations is the virtual tower, which replaces the physical tower at the airport with a control room that might be hundreds of miles away. Linked to an array of cameras and all the same computing resources used by a physical tower, the virtual tower presents the illusion of physically working at an on-site tower. This model eliminates the need to establish a full ATC tower at a low-use airport and opens the door to virtualization and centralization of tower operations for a number of such airports. With a single virtual control tower supporting multiple airports, smaller airports can implement more robust yet more economical ATC systems. This approach also supports disaster recovery, making it easy to take remote control over ATM if the primary tower location is somehow compromised.

Modern KVM technology in airport operations brings higher reliability through redundant features and resilient network configurations that eliminate any central point of failure. KVM switching and extension support ergonomic workspaces and streamlined workflows, help to reduce power and maintenance costs while increasing operational flexibility, and give airport management the tools they need to create new paradigms for the deployment and control of ATC and ATM systems. ❖