


*São Paulo/Guarulhos International Airport (GRU), South America's largest and busiest airport.*

# Connecting the Dots: The Real Power Behind Digital Towers

By ACAMS

***Connecting systems, standardising data and creating a common operational environment are the foundations of successful digital and remote tower operations.***

Digital and remote towers are transforming air traffic control. Advanced cameras, digital displays and AI-enabled tools may be the most visible elements of this transformation, but they are not where successful digitalisation begins. Before operations can be digitalised or managed remotely, the different systems supporting the tower must be able to communicate, exchange data and operate as part of one coherent environment.

For ACAMS, this integration layer is fundamental. With more than 450 systems delivered in over 45 countries since 2001 - including the delivery of more than 100 I-TWR installations, ACAMS has built its expertise around bringing different systems, technologies and suppliers together.

The objective is not digitalisation for its own sake, but a controlled evolution towards safer, simpler and more scalable tower operations.

### *Integration before digitalisation*

Tower environments are inherently complex. Airfield lighting, navigation aids, meteorological data, ATIS, surveillance, emergency systems and technical monitoring may come from different suppliers like ACAMS, use different technologies and have been introduced at different moments in an airport's development.

Moving towards a digital or remote environment without first addressing this fragmentation risks transferring the same complexity to a new platform. The first challenge is therefore interoperability: creating a common architecture in which systems can exchange information consistently and operators can work through a unified environment.

This is the principle behind ACAMS' Integrated Tower (I-TWR). Rather than replacing every existing subsystem, I-TWR integrates best-

in-class applications into a homogeneous operational environment. Its unified Human-Machine Interface (HMI) gives controllers access to critical monitoring, control and information functions through a coherent interface, reducing operational complexity and workload while supporting situational awareness and safety.

The I-TWR sits between the airport's existing systems and the controller working position, whether in a conventional tower or on a remote tower platform, so airports and ANSPs keep their choice of equipment and remote tower supplier at both ends. ACAMS does not compete with either layer; it connects them.

### *A common language for a scalable architecture*

The same principle becomes even more important when operations extend beyond a single tower. Remote tower concepts require systems at multiple airports - often with different infrastructure - to connect reliably to a central operating environment.

ACAMS addresses this challenge through its Airport Systems Interface (ASI): a dedicated integration layer designed to connect diverse airport equipment through a standardised framework. Local processing at each airport can be combined with centralised control, allowing data and system interfaces to be managed consistently across multiple locations.

In practical terms, ASI makes different airport systems "speak the same language." This enables consistent data processing, interoperability and operational continuity, while allowing airports and ANSPs to migrate step by step rather than through a disruptive, all-at-once transformation.

### *Evolving I-TWR for the next generation*

ACAMS' next generation of I-TWR builds on these proven integration capabilities with an architecture designed for increasingly digital and distributed operations. It is more open and standardised, more scalable in deployment and aligned with modern cybersecurity requirements.

Reliability and operational continuity remain fundamental to every ACAMS solution. The software is developed in accordance with EUROCAE ED-109A, while traditional I-TWR deployments have relied on dual-redundant server configurations with hot standby to support high availability.

But the future of digital and remote towers demands more than traditional redundancy. ACAMS is embracing a modern, microservices-based software architecture that enables greater modularity, flexibility and scalability. By allowing individual software components to evolve and be managed more independently, this approach supports faster innovation, easier integration of new technologies and more adaptable deployment models.

This architectural evolution will also shape the next generation of I-TWR, which is planned to migrate progressively towards a microservices-based environment. Combined with ACAMS' proven system integration capabilities, it will provide a foundation for increasingly connected, distributed and remotely managed tower operations.

The objective remains unchanged: operational reliability and continuity. What is changing is the technology architecture that enables ACAMS to deliver them.

### *From integration to digital and remote operations*

This approach changes the digital-tower discussion. The transition does not need to begin with a complete replacement of the conventional tower. Airports and ANSPs can first integrate existing systems, standardise interfaces and digitalise individual functions. Once that foundation is in place, new capabilities - including advanced visualisation, decision support-tools and remote operation - can be added within a controlled and scalable architecture.

**Norway.** In Norway, ACAMS is part of NINOX, Avinor's national remote tower programme, operated from Bodø since 2019 in what is described as the world's largest digital tower centre. As a subcontractor to Indra Navia, ACAMS integrates airport-placed equipment such as airfield lighting, weather systems, ATIS, navaids and crash alarm into one standardised interface towards the remote tower platform.

**Greenland.** In Greenland, ACAMS has deployed an integrated suite of solutions including ATIS at Nuuk, with further deployments at Qaqortoq and Ilulissat. I-TWR and the Technical Control & Monitoring System (TCMS) bring airport systems into a digital control environment. Functions previously managed through physical controls, including airfield lighting, can consequently be monitored and controlled through screen-based interfaces.

**Brazil.** In Brazil, ACAMS works with CISCEA, the Brazilian Airspace Control System Implementation Commission, to upgrade Integrated Control Tower Systems at more than 30 sites. The programme covers hardware, software, functional modules and external system interfaces — illustrating the importance of system integration when modernising complex operational environments.

**Canada.** ACAMS signed a framework agreement with NAV CANADA in 2025 to supply the Airport Systems Interface (ASI) for its Digital Aerodrome Air Traffic Services (DAATS) programme, starting with Kingston Flight Service Station. ASI gives every working position in the DAATS digital hubs one standard endpoint for non-standard airport systems

### *The foundation comes first*

Digital and remote towers will continue to introduce new technologies, from enhanced visualisation to AI-assisted decision support. Their value, however, depends on the quality of the architecture underneath them.

For ACAMS, the route towards the digital tower therefore starts with integration: connect the systems, standardise the interfaces and create a coherent operational environment. From there, airports and ANSPs can digitalise, centralise and scale with confidence.
The technology visible to the controller may change. The foundation remains the same: systems and how they interface must work seamlessly together.

Want to know more on how ACAMS supports your move to digital and/or remote towers?

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*HMI of the ACAMS I-TWR solution*

