

# Bringing the Commissioning Process to Airport Special Systems

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As airport security, communication, conveyance, fire/life safety, common use and other technology systems grow more complex, so do the challenges of verifying that these systems work together properly, seamlessly and as designed. Given the critical role special systems play in the Operational Readiness, Activation and Transition (ORAT) process, their commissioning requirements must be detailed in contract documents and the master construction schedule critical path and finished well before substantial completion and occupancy.



Historically, commissioning has been considered the final phase of a construction project. Given sometimes confusing and contradictory terminology, however, commissioning practices have not always been adequately described or applied before construction is complete under this long-standing model. This can be especially true when there is pressure for the facility to be accepted by authorities having jurisdiction, turned over to the owner and placed into service. In these cases, commissioning professionals and other owner's representatives are unable to document processes adequately and are unable to execute functional test procedures to verify that systems are installed and operating as the owner was promised.

Evolving approaches to commissioning, however, now consider the sophisticated technology systems deployed at today's airports. For these operationally complex facilities to function efficiently, often amid ongoing construction,

the commissioning process must begin far sooner — ideally, as early as the schematic design phase. In addition to providing end-stage quality assurance, the commissioning team is now also a communication conduit for the tracking and testing of special airport systems, from original design and project specifications through final installation, including integration with existing monitoring and control systems.

## Addressing System Complexity Challenges

In most cases, commissioning focuses largely on a facility's mechanical, electrical and plumbing systems. Today's airport construction projects include the design and installation of flight and gate information displays, paging systems, wireless networks, baggage handling systems, passenger conveyance and boarding systems, and other specialty systems that require familiarity with smart technologies, building automation and master systems integration. Most are procured from original equipment manufacturers (OEMs) or integrators that deliver

turnkey solutions. To facilitate activation according to owner preferences, a knowledgeable party is needed to adjudicate potential conflicts and contract disputes between these contractors, technology vendors and airport stakeholders.

Similar support is often needed to address:

### **Systems Integration and Interoperability**

An airport's information technology (IT) and other specialty systems rarely function independently. For example, a smoke event that activates a fire alarm system will likely also trigger a range of fire suppression and security responses. A commissioning plan that articulates each party's roles and responsibilities in accordance with the master schedule must therefore consider not only individual assets but also how they interface with various system configurations.

Building- or concourse-level systems also often feed into complex, campus-level systems. The conveyance monitoring system used for escalators and other vertical transportation systems throughout an airport, for example, may be monitored by a single building operator in a distributed control room location. When one escalator malfunctions, both a building-level network and a campus-level network may need to be alerted. Attention to these interfaces and intersystem communication is essential to successful system startup and operation.

### **Demands for Operational Readiness**

The central role that IT and special systems play in ORAT raises the stakes even further. Early planning, detailed specifications, repeated testing and simulated occupancies are key to reducing the risks associated with bringing complex new systems online. Equally important are open lines of communications with key stakeholders, which often include airport management teams, airlines, Federal Aviation Administration (FAA), Transportation Security Administration (TSA), Customs and Border Protection (CBP), concessionaires, state and local agencies, and other governing bodies.

The probability of delays and cost overruns grows significantly when commissioning documents, drawings, specifications and functional testing protocols are insufficient or incomplete. Facility activation can be delayed, for example, if a system commissioned to operate properly at the concourse is not also correctly integrated with campus-level controls. Similarly, an electrical power monitoring system that passes commissioning tests for tracking power quality and usage locally may not achieve operational readiness if its ability to monitor electrical distribution throughout an airport campus is untested. Adequate commissioning calls for every gap to be filled.

### **Rapid Pace of Change**

IT standards and solutions change quickly, often faster than construction can be completed on many multiyear airport projects. The commissioning team must be forward-thinking and equipped with the relevant IT experience to properly anticipate the technology curve. High-level reviews are required so systems that will likely need updates during the project life cycle can be identified from the onset. Commissioning professionals must be able to anticipate system upgrades and prepare commissioning plans that can adapt as equipment needs or agency mandates evolve.

For example, advances in face recognition technology can impact camera requirements and placement throughout an airport, while also triggering new automation requirements or streamlining other security procedures. Upgrades to a communication system can impact its integration with other assets and facilities management systems. The commissioning plan that is implemented must be designed to address subsystem updates taking place upstream or downstream from the integrated systems.

### **New Prerequisites for Commissioning Success**

To reduce ORAT risks, improve transparency and meet project goals, airport owners and their general contractors have begun to rethink the commissioning team's composition and role. The criteria for commissioning complex airport projects now include:

#### **Early Project Involvement**

When engaged early — before schematic design begins — commissioning professionals with experience in IT, security and airport-specific systems can offer insights that place projects on a sound path. Their input on project specifications can help preempt integration issues down the road. Even airports with robust IT staffs will benefit from early commissioning guidance on difficult challenges, such as managing the points where multiple systems integrate.

Some commissioning professionals — because of their deep airport IT experience — now serve in a dual role as IT manager or liaison. While designers and contractors operate largely in silos, commissioning professionals/IT managers focus on the big picture, providing much-needed continuity over a project's life cycle. Their understanding of a project's history and objectives can inform their understanding of the downstream impacts of any changes.

Project transparency and accountability are also enhanced when commissioning milestones and granular details, such as asset-level activities, are added to a project's overall schedule. Omitted from many construction schedules, these details provide owners with a contractual lever they can use to hold

contractors and vendors accountable for their work. By linking asset commissioning activities to a master schedule, the commissioning provider can also advocate for appropriate commissioning periods, instead of simply responding to end-of-project scheduling demands for resources, equipment, and system and area turnovers.

### Commissioning Document Management System

Port authorities, city governments and other agencies responsible for airport operation share a common trait: They value transparency. They want clear and reliable ways to stay abreast of commissioning status on a given day, week or month. They need to be alerted to activation delays and budget overruns, their causes, and the plans for their resolution. They want proof that they are getting what they paid for.

A robust commissioning document management system can address these needs and more. Essential to the commissioning of complex airport projects, web-based platforms like Facility Grid facilitate the development and management of commissioning checklists, test procedures, issue logs and other documentation needed to track equipment and system status. Commissioning teams configure these systems to alert contractors to pre-functional checklists and other documentation they must complete on the equipment or systems they are responsible for delivering. Issue logs advise owners and other responsible parties of problems and their resolution.

Document management platforms also improve commissioning efficiency, making it possible for commissioning professionals to manage work remotely until all documents are submitted and final on-site testing greenlighted. They also provide the transparency needed by all parties preparing for the transition of building occupancy and operations.

### Airport IT, Security and Special Systems Knowledge

Commissioning professionals need more than traditional mechanical, electrical and plumbing capabilities to test and verify the complex systems found in today's airports. Consider flight information displays, for example. Experience with multilayered integration is often needed to commission these systems, which may incorporate visual paging and sophisticated wireless technologies that provide audio messaging through hand-held devices in emergency situations.

Cameras, access control, card readers and other security system components pose testing and integration complexity that require understanding of existing security system operations and TSA requirements. Other integration challenges arise in passenger boarding areas, where automation technologies create opportunities for common use gates that must accommodate the needs of multiple airlines and aircraft

sizes. Similarly, increased focus on digitalization has created the need for greater IT proficiency when connecting new gates, security systems and terminal facilities to central utility plants and facilities management systems.

### Growth in Work Groups

Airport construction projects involve many stakeholders. Rather than inviting dozens of participants to large status meetings, commissioning professionals for today's complex projects aim for smaller, focused work groups that address specific challenges instead. For example, a centralized security forum — involving the general contractor, equipment vendors and operation and maintenance providers — can help fill gaps that emerge when new devices are integrated into an airport's existing security system. An FAA work group can focus on the aviation regulations that must be met in the integration process.

Work groups like these can break down the walls of otherwise siloed operations and provide a forum where communication stays current. Such work groups include only the team needed to address the issue at hand.

### Redefining the Commissioning Professional's Role

Like the systems it is designed to test and verify, the commissioning process itself is evolving. Much more than a final test of equipment operations, commissioning today is critical to an airport's ability to achieve operational readiness on schedule and within budget. By recognizing commissioning as an independent discipline and engaging qualified commissioning professionals at the onset of complex airport projects, airport owners can fully leverage commissioning and ORAT to maximize their capital investments.

A complete, accurate and accessible record of documentation is essential to realize the full value of the special systems commissioning process. Owner preferences for the location of and accessibility to record documents needs to be addressed early and built into the specifications so that operations staff is not only well trained but also able to access needed documentation easily and quickly.

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