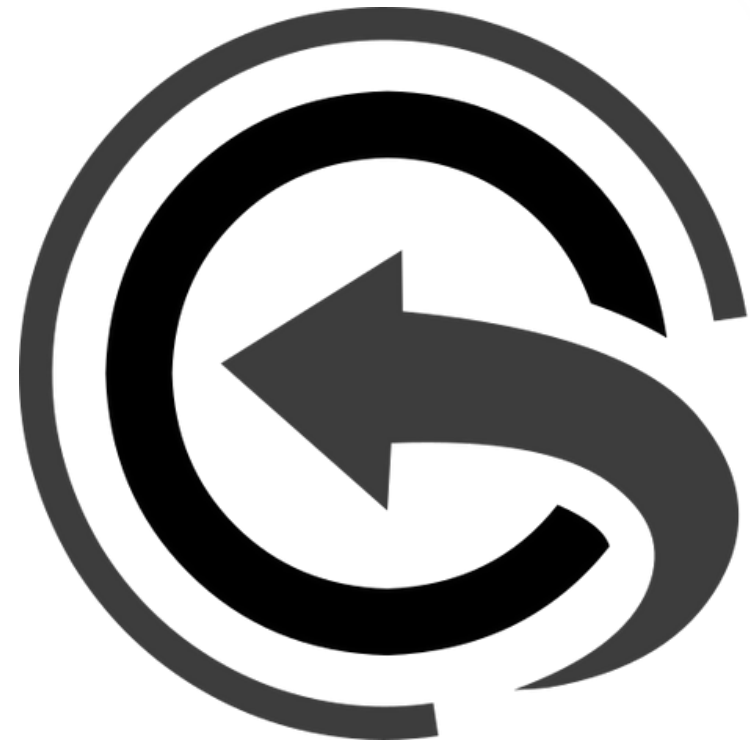




Commwork ICT

Information & Communication Technologies

AVIATION ICT INFRASTRUCTURE SOLUTIONS

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Expertise in Airport ICT

Delivering Connectivity and Security

Since 2014, Commwork ICT has been providing design and implementation services for information and communication technologies (ICT), security, and aviation systems infrastructures in airport projects. The company has successfully completed numerous domestic and international airport projects, taking on various roles throughout each stage.

With a team of internationally experienced engineers and designers who closely follow advancements in aviation technologies.

Commwork ICT aims to become a globally recognized brand by delivering innovative and reliable solutions.



Expertise: Globally Experienced Engineers & Designers

Established

Commwork ICT was founded in 2014, focusing on aviation projects.

In our first year, we completed several projects showcasing our capability and commitment.

Team Expansion

Our team grew to include various internationally experienced engineers and designers.

The team now includes diverse professionals experienced in international ICT standards.

Sustainability

We prioritize reliable, efficient, and sustainable design in all projects.

Our focus on sustainability drives us to implement eco-friendly practices in design.

Global Office

In 2024, we opened a consulting and design office in London to enhance our global reach.

The London office allows us to better serve our international clients with localized expertise.



Think
Future

Key Milestones in Airport ICT Design

Concept Development & Master Planning

- Define the airport's digital vision and ICT strategy aligned with operational goals.
- Identify key systems: network infrastructure, data centers, security, passenger systems, and integration with building and airside operations.
- Establish design standards and technology frameworks (e.g., BIM, Revit, ISO standards).

Requirements Definition & Stakeholder Workshops

- Engage airport authorities, airlines, ATC, and facility operators to capture functional and technical requirements.
- Develop system interface matrices and integration maps.
- Define cybersecurity, redundancy, and scalability requirements.

Preliminary Design (Concept Design Stage)

- Prepare high-level ICT architecture and system schematics.
- Identify major equipment rooms, cable routes, and backbone infrastructure.
- Conduct initial cost estimation and risk assessment.

Key Milestones in Airport ICT Design

Detailed Design Development

- Produce detailed drawings, specifications, and schedules for all ICT systems (LAN, WLAN, SAS, MS, CCTV, PA, FIDS, BMS, SCADA, etc.).
- Coordinate with architectural, structural, and MEP disciplines using BIM models.
- Validate system performance through simulations and design reviews.

Tender Documentation & Procurement Support

- Prepare tender packages including technical specifications, BoQs, and compliance matrices.
- Support bid evaluation and vendor selection.
- Review shop drawings and material submittals for compliance.

Implementation & Construction Support

- Oversee installation, testing, and commissioning of ICT systems.
- Ensure adherence to design intent and quality standards.
- Manage change control and as-built documentation updates.

Integration

Integration & System Testing

- Conduct integrated testing across all ICT and airport operational systems.
- Validate interoperability between subsystems (e.g., FIDS, BHS, AODB, CCTV).
- Perform performance and failover testing.

Handover & Operational Readiness

- Deliver final documentation, training, and maintenance manuals.
- Support ORAT (Operational Readiness and Airport Transfer) activities.
- Monitor system performance during initial operations.

Post-Implementation Review & Optimization

- Evaluate system performance and user feedback.
- Implement fine-tuning, upgrades, and future-proofing strategies.
- Document lessons learned for future projects.

Passenger Terminal Building

The IT, SAS, and Security systems in an airport terminal are designed to ensure safe, efficient, and seamless operations for passengers, airlines, and airport authorities. These systems form the digital backbone of the terminal, enabling real-time communication, automation, and coordination across all airport functions — from passenger processing and baggage handling to security monitoring and facility management.

A well-integrated ICT infrastructure ensures operational continuity, data integrity, and situational awareness, minimizing delays and enhancing the passenger experience.

At this stage, the ICT design role is to define the architecture, standards, and integration framework that connect all these systems into a unified, reliable, and scalable platform.

Commwork coordinates between disciplines, ensure compliance with international aviation standards, and translate operational requirements into technical solutions. Our work guarantees that every subsystem — whether IT, SAS, or Security — operates harmoniously within the airport's overall digital ecosystem.



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Passenger Terminal Building

ICT Infrastructure

- Structured Cabling System: High-performance fiber optic and copper cabling supporting data, voice, and video communication across the terminal.
- Data Centers and Server Rooms: Redundant power, cooling, and fire suppression systems ensuring 24/7 operation.
- Network Systems: Core, distribution, and access layer architecture with high-availability switches and routers.
- Wireless Connectivity: Secure Wi-Fi coverage for passengers, staff, and operational systems.
- Telecommunication Systems: IP-based telephony, intercom, and public address integration.
- BMS and SCADA Integration: Centralized monitoring and control of building systems such as HVAC, lighting, and energy management.

SAS (Special Airport Systems)

- FIDS (Flight Information Display System): Real-time flight data displayed throughout the terminal.
- BHS (Baggage Handling System): Automated baggage transport, sorting, and tracking integrated with airline systems.
- CUPPS/CUSS: Common-use passenger processing and self-service kiosks for check-in and boarding.
- PAS (Public Address System): Zoned announcements integrated with emergency and evacuation systems.
- Master Clock System: Synchronization of all time-dependent systems across the terminal.

Security Systems

- CCTV and Video Analytics: Intelligent video monitoring for operational and security purposes.
- Access Control System: Card and biometric-based access for restricted areas.
- Screening Systems: X-ray, CT, and explosive detection systems for passengers, baggage, and cargo.
- Command and Control Center: Centralized monitoring of all security and operational systems.
- Cybersecurity: Network segmentation, firewalls, and intrusion prevention systems protecting critical airport data.
- Emergency Communication Systems: Integration with fire alarms, evacuation guidance, and crisis management platforms.



Passenger Terminal Building

ICT Infrastructure

Commwork ICT delivers integrated airport technology solutions ensuring seamless, secure, and efficient operations. The infrastructure includes a **Structured Cabling System** with high-performance fiber and copper networks supporting data, voice, and video communication. **Data Centers and Server Rooms** are designed with redundant power, cooling, and fire protection for continuous 24/7 operation. The **Network Systems** architecture provides high availability through core, distribution, and access layers. **Wireless Connectivity** ensures reliable Wi-Fi access for passengers, staff, and operational systems. **Telecommunication Systems** integrate IP telephony, intercom, and public address functions for unified communication. Through **BMS and SCADA Integration**, all building systems such as HVAC, lighting, and energy management are centrally monitored and controlled, enhancing efficiency and sustainability.



Passenger Terminal Building

Telecommunication Spaces

Concept and Planning Stage

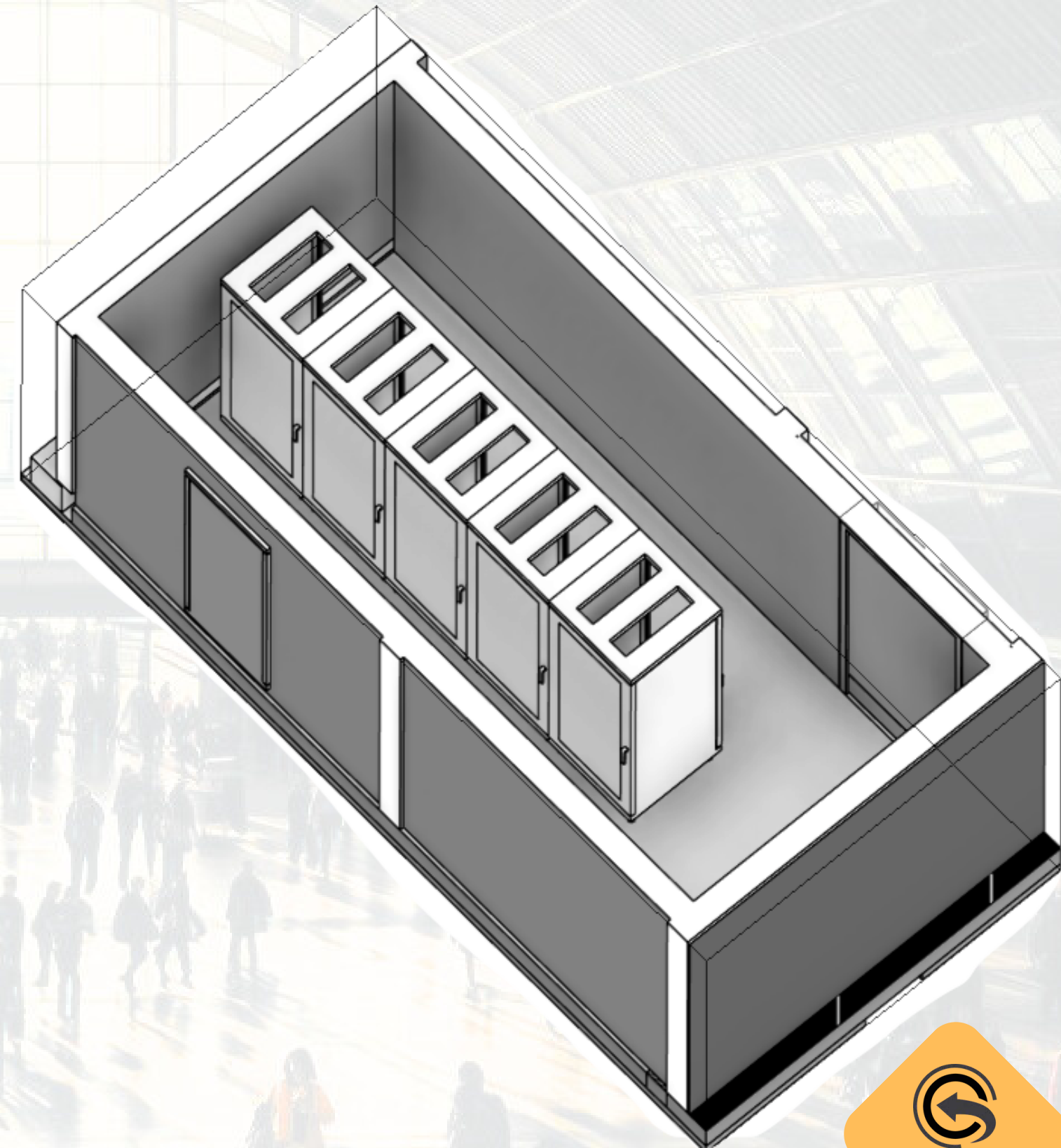
- Identify all ICT, communication, and control systems (CCTV, PA, FIDS, BHS, SCADA, etc.) and their spatial needs.
- Coordination with Stakeholders: Align with airport authorities, airlines, and IT service providers to define capacity, redundancy, and future scalability.
- Space Allocation: Reserve dedicated rooms for MDF (Main Distribution Frame), IDF (Intermediate Distribution Frame), and equipment racks early in terminal planning.

Preliminary Design Stage

- Network Architecture Layout: Develop backbone and horizontal cabling routes, ensuring separation between critical and non-critical systems.
- Environmental Requirements: Define HVAC, power, grounding, and fire protection standards for telecom rooms.
- Integration with BIM Models: Coordinate with architectural, structural, and MEP disciplines to avoid clashes and optimize cable pathways.

Detailed Design Stage

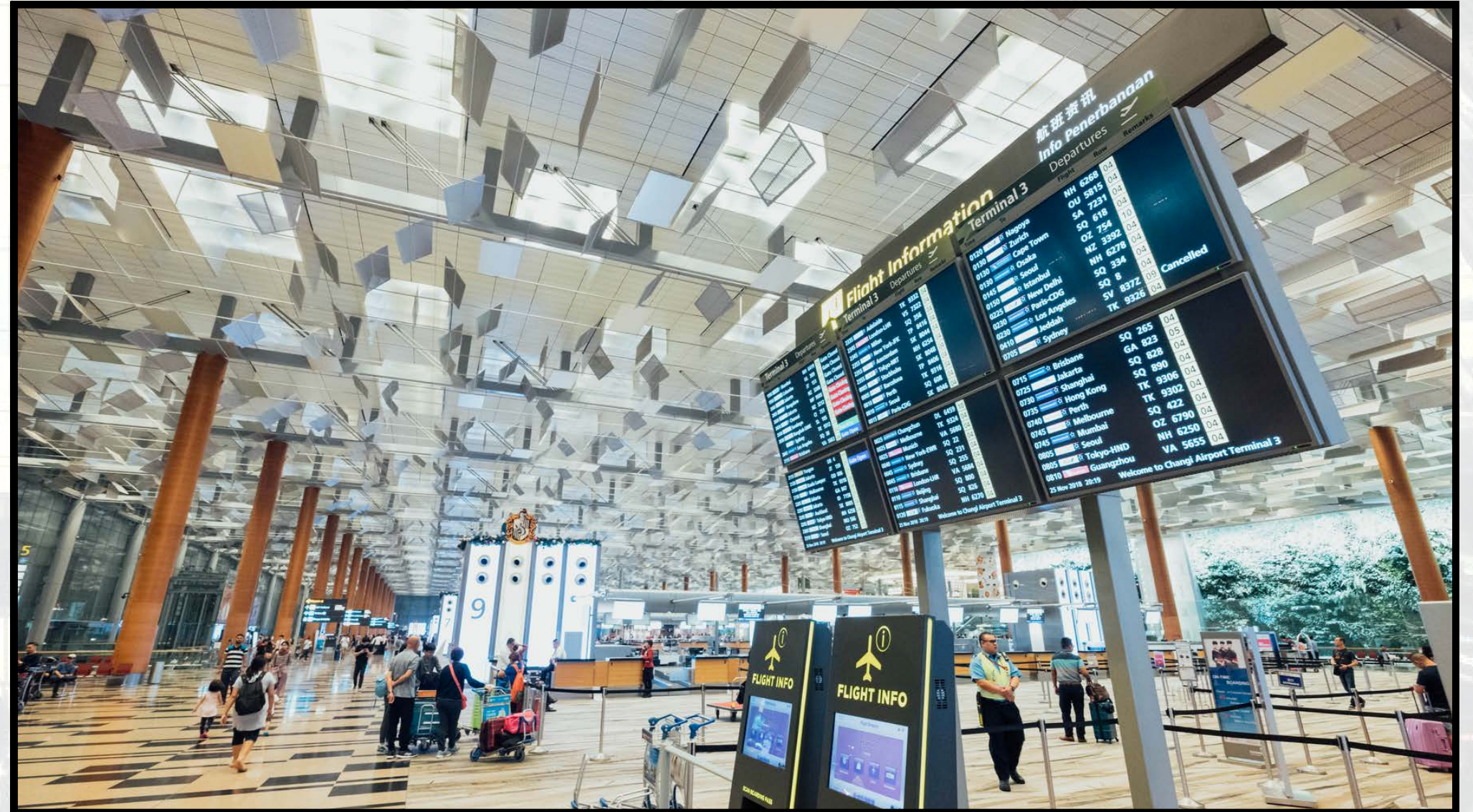
- Room Layouts and Rack Arrangements: Finalize detailed layouts for telecom rooms, including rack positioning, cable trays, and labeling systems.
- Redundancy and Resilience: Design dual-path fiber routes and redundant power supplies to ensure uninterrupted operations.
- Compliance and Standards: Ensure adherence to international standards (TIA/EIA, BICSI, ICAO, IATA) and local regulations.



Passenger Terminal Building

Special Airport Systems

Commwork ICT provides advanced Special Airport Systems ensuring efficient, safe, and passenger-oriented terminal operations. The Flight Information Display System (FIDS) delivers real-time flight data across the terminal, enhancing passenger communication and wayfinding. The Baggage Handling System (BHS) automates baggage transport, sorting, and tracking, fully integrated with airline and security systems for accuracy and speed. CUPPS/CUSS platforms enable common-use passenger processing and self-service kiosks, optimizing check-in and boarding efficiency. The Public Address System (PAS) supports clear, zoned announcements integrated with emergency and evacuation functions for safety and coordination. The Master Clock System ensures precise synchronization of all time-dependent systems throughout the terminal, maintaining operational consistency and reliability.



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Passenger Terminal Building

Security Systems

Commwork ICT delivers comprehensive airport security solutions designed to ensure safety, efficiency, and regulatory compliance. The CCTV and Video Analytics system provides intelligent video monitoring for both operational and security purposes, enabling real-time incident detection and response. The Access Control System uses card and biometric technologies to manage entry to restricted areas, ensuring only authorized personnel gain access. Screening Systems incorporate advanced X-ray, CT, and explosive detection technologies for passengers, baggage, and cargo, maintaining the highest safety standards. The Command and Control Center serves as the central hub for monitoring all security and operational systems, providing situational awareness and coordinated response capabilities. Cybersecurity measures, including network segmentation, firewalls, and intrusion prevention systems, protect critical airport data and infrastructure. The Emergency Communication Systems integrate with fire alarms, evacuation guidance, and crisis management platforms, ensuring rapid and effective communication during emergencies.



Airport WAN

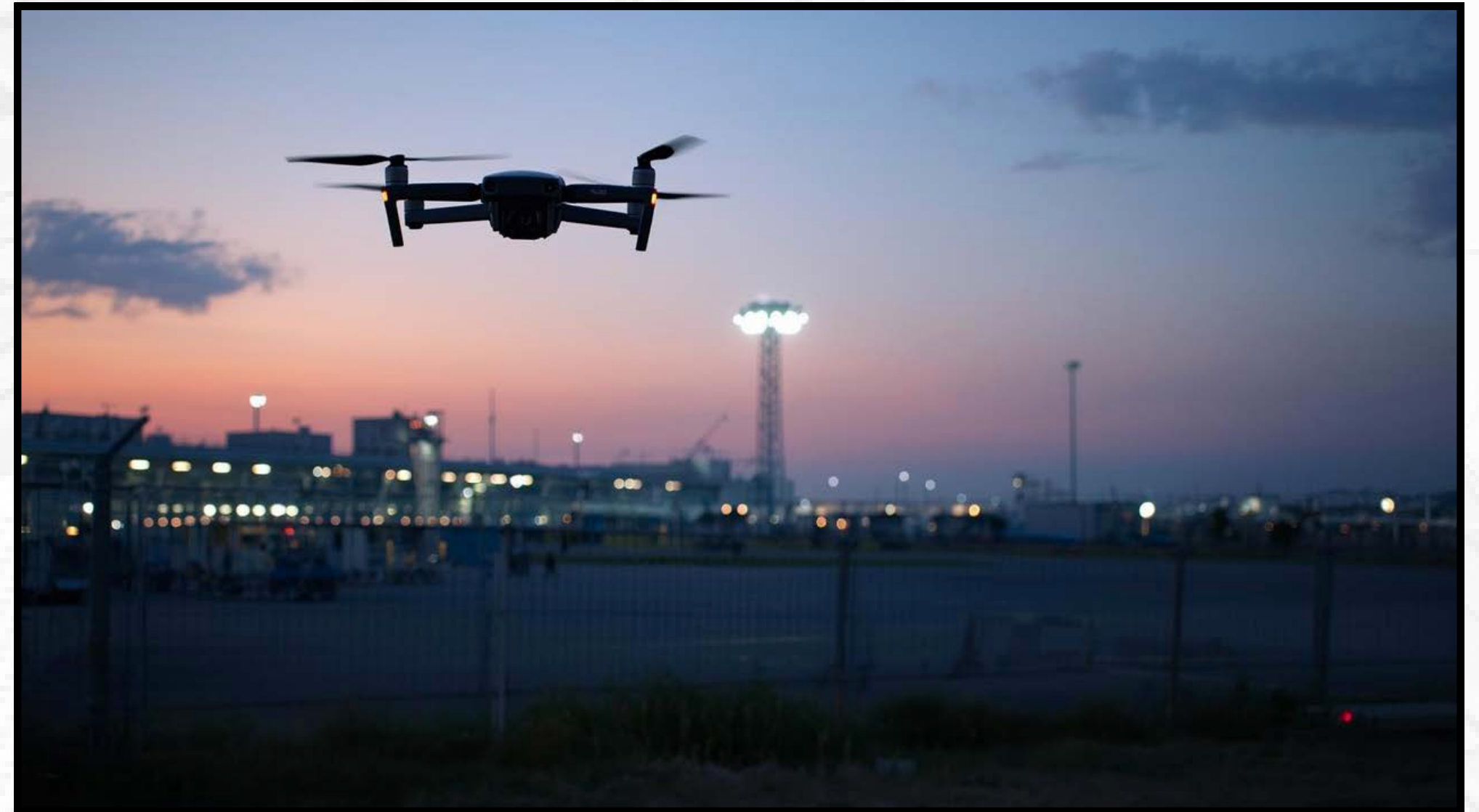
The airport WAN connects all terminals, data centers, and remote facilities through a secure and high-performance network. It ensures reliable communication between operational systems such as AODB, FIDS, BHS, and CCTV. The design includes redundant fiber routes, scalable core switches, and secure gateways to support 24/7 airport operations with high availability and resilience.

A well-designed WAN is critical for seamless airport operations. It enables real-time data exchange between systems, supports mission-critical applications, and minimizes downtime. Proper WAN design enhances network security, scalability, and performance, ensuring continuous service for passengers and airport stakeholders.



Perimeter Security

Airport perimeter security is a vital element of aviation safety, designed to prevent unauthorized access and protect critical infrastructure. It combines physical barriers such as high-security fencing and controlled gates with advanced technologies including intrusion detection sensors, CCTV with video analytics, and thermal imaging systems. Integrated with the airport's command and control infrastructure, these systems enable real-time monitoring, rapid incident response, and compliance with international standards such as ICAO Annex 17. A well-designed perimeter security system ensures operational continuity, passenger safety, and overall airport resilience.



ATC Tower

The ICT infrastructure in an Air Traffic Control (ATC) tower is one of the most critical components of airport operations. It ensures safe, efficient, and continuous management of air traffic, both on the ground and in the air. A well-designed ICT infrastructure supports the seamless integration of systems, data, and communication channels essential for air traffic controllers and airport operations.

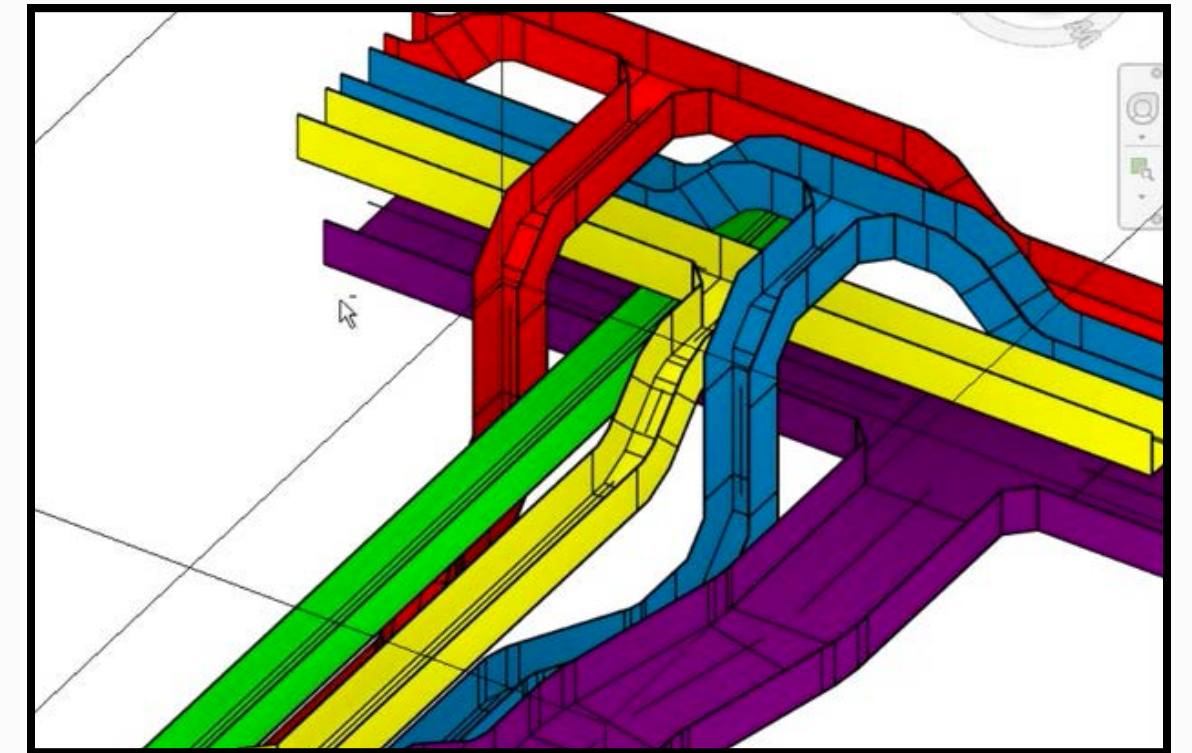
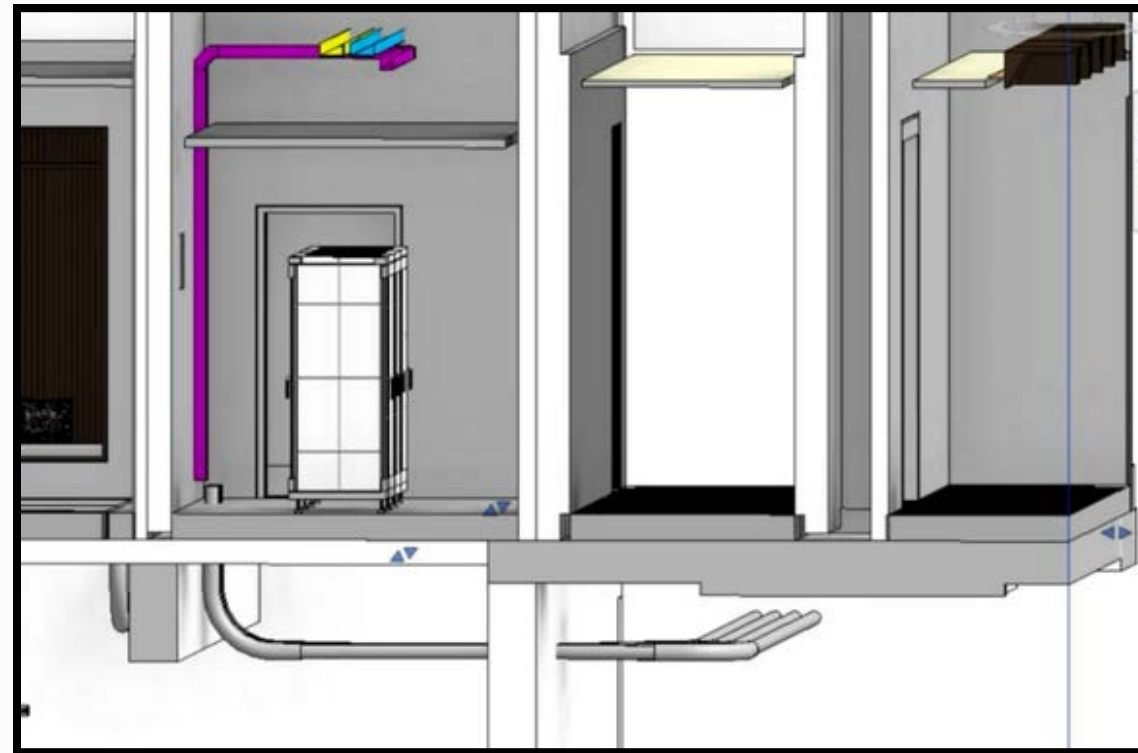
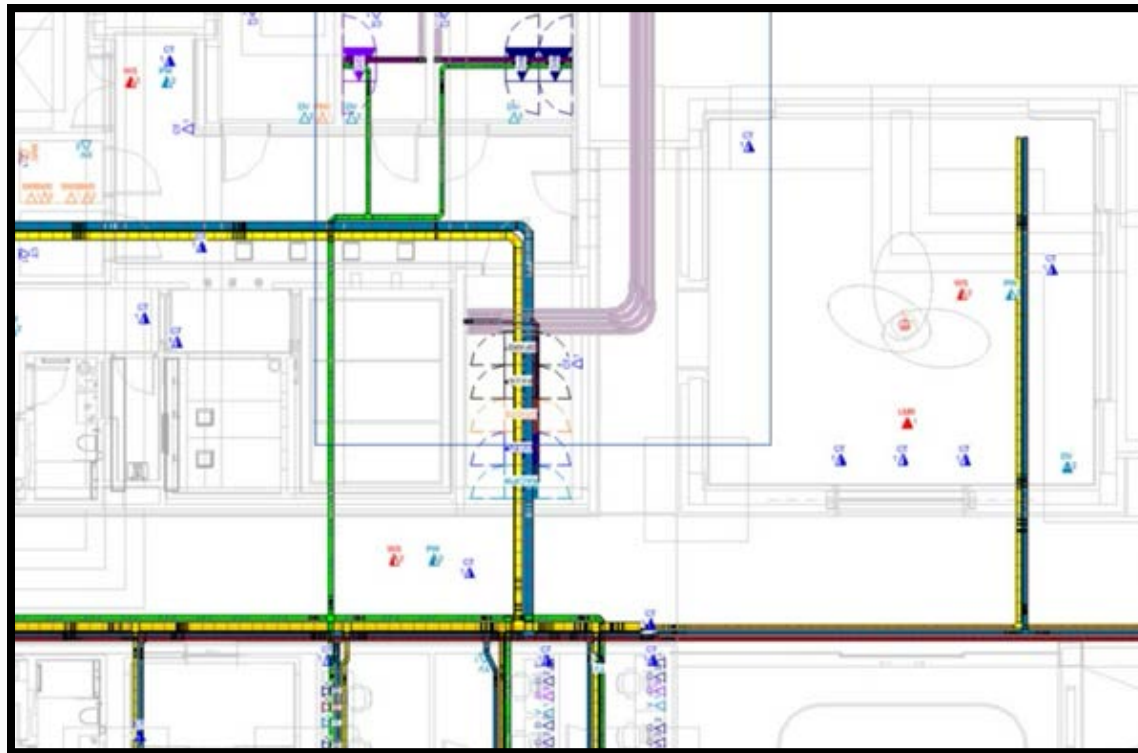
ATC towers rely on real-time voice and data communication between controllers, pilots, and ground operations. Proper ICT design ensures low-latency, high-availability networks that support VHF/UHF radio systems, VoIP, and intercom systems. This enables precise coordination and quick decision-making during critical operations.

Navigation systems such as Instrument Landing Systems (ILS), VOR/DME, GNSS, and ADS-B are essential for guiding aircraft safely during approach, landing, and en-route phases. ICT infrastructure plays a vital role in connecting these navigation aids to the ATC network, ensuring accurate data transmission, synchronization, and monitoring. Proper design guarantees that navigation data is reliably distributed to controllers and integrated with surveillance and flight data systems, enhancing situational awareness and precision in aircraft guidance.



Design Tools

Designing ICT infrastructure—especially for complex environments like airports and ATC towers—requires a combination of software tools that support planning, modeling, documentation, and coordination across multiple disciplines. These tools help ensure accuracy, efficiency, and compliance with technical and regulatory standards.



Design Tools

1. Building Information Modeling (BIM) Tools

BIM platforms are essential for integrating ICT systems into architectural and engineering designs. They allow 3D modeling, coordination, and clash detection between ICT, electrical, mechanical, and structural systems.

- Autodesk Revit – Widely used for creating detailed ICT layouts, cable routing, and equipment room designs.
- Navisworks – Used for model coordination, clash detection, and project visualization.

2. Computer-Aided Design (CAD) Tools

CAD tools are used for detailed 2D drawings, schematics, and layouts of ICT systems, including cabling, racks, and device placements.

- AutoCAD – Standard tool for ICT schematic drawings, network layouts, and as-built documentation.
- MicroStation – Used in some infrastructure projects for detailed drafting and integration with civil works.

3. Network Design and Simulation Tools

These tools help design, simulate, and validate ICT network performance, ensuring reliability and redundancy.

- Cisco Packet Tracer – For simulating network configurations and testing connectivity.
- SolarWinds Network Topology Mapper – For visualizing and documenting network architecture.
- Ekahau or iBwave – For wireless network design, coverage analysis, and optimization.

4. Cable Management and Pathway Design Tools

Used to plan and document structured cabling systems, including fiber, copper, and containment routes.

- Bentley Raceway and Cable Management – For 3D cable routing and coordination with other disciplines.
- Visio or CAD-based templates – For rack elevations, patch panel layouts, and labeling schemes.



AI in Airport Operation

Artificial intelligence has become a key enabler for improving airport operational efficiency, optimizing resource utilization, and accelerating decision-making. AI-driven systems analyze large volumes of operational data to provide real-time insights and reduce human error.

- **Flight Operations Management:** AI algorithms can perform predictive analysis for flight scheduling, stand allocation, baggage flow, and apron traffic. By analyzing weather, air traffic, and ground handling data, AI can forecast potential delays, enabling proactive resource planning and timely passenger communication.
- **Security and Surveillance Systems:** Computer vision-based AI systems analyze CCTV footage to automatically detect suspicious behavior, unattended baggage, or security breaches. These systems send instant alerts to security teams, allowing faster and more accurate responses.
- **Maintenance and Equipment Management:** AI-powered predictive maintenance applications identify potential failures in ground service vehicles, baggage handling systems, HVAC, and energy infrastructure. By analyzing sensor data, maintenance schedules can be optimized, minimizing downtime and operational disruptions.
- **Operational Decision Support Systems:** AI-based decision support platforms integrate data from apron, terminal, and air traffic operations to provide dynamic recommendations. These systems assist in congestion management, staff allocation, and emergency response planning, improving overall operational resilience.



AI in Passenger Experience

Passenger experience is a defining factor for airport reputation. AI enhances this experience through personalized services, intelligent navigation, and real-time communication.

- **Smart Passenger Flow Management:** AI-driven image processing systems analyze passenger density across terminals and dynamically update digital signage and wayfinding displays. This helps balance queues at security, immigration, and boarding gates, improving passenger flow.
- **Personalized Information and Virtual Assistants:** Natural language processing (NLP)-based virtual assistants provide passengers with flight updates, navigation help, shopping suggestions, and transfer options. Integrated into mobile apps, these AI systems deliver real-time notifications based on passenger location and flight status.
- **Facial Recognition and Biometric Systems:** AI-enabled biometric verification accelerates check-in, security screening, and boarding processes. These systems enhance both security and passenger convenience by reducing manual checks and wait times.
- **Sentiment Analysis and Service Quality Monitoring:** AI analyzes social media and customer feedback to assess passenger sentiment. Insights from this analysis help airport management improve service quality and address issues proactively.
- **Data Management and Integration:** AI systems must integrate data from AODB, BHS, SCADA, CCTV, IoT sensors, and passenger information systems. A centralized data lake and robust ETL (Extract, Transform, Load) framework are essential for seamless data flow and analytics.
- **Security and Access Control:** Since AI systems handle sensitive operational and personal data, cybersecurity measures such as network segmentation, identity management, and encryption must be implemented at all levels of the data center.



Commwork ICT's Infrastructure Solutions for AI-Driven Airport Systems

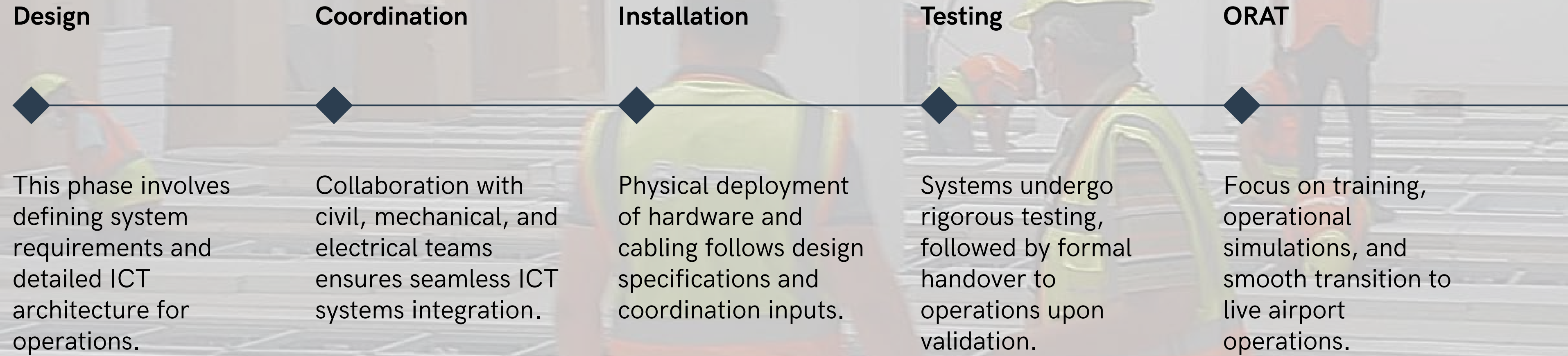
Commwork's Role in AI-Ready Airport Infrastructure TV, SCADA, IoT sensors, and passenger information systems. This unified backbone ensures low-latency data exchange, which is essential for real-time AI analytics and automation.

- **AI-Optimized System Integration:** Commwork's system integration expertise allows seamless communication between legacy airport systems and new AI platforms. Through middleware and API-based integration, data from various subsystems can be aggregated into a unified analytics environment.
- **AI-Ready Data Center Design:** Commwork design and implement modular, scalable data centers optimized for AI workloads. This includes high-density racks, GPU-based compute clusters, and high-speed storage systems capable of handling large-scale data analytics and machine learning operations.
- **Data Lake and Integration Platform:** Commwork can establish a centralized data lake architecture that consolidates data from AODB, SCADA, CCTV, and IoT systems. This platform enables AI models to access clean, structured, and real-time data for predictive and prescriptive analytics.
- **Energy Efficiency and Sustainability:** Commwork implement intelligent power and cooling systems within data centers, using AI-based monitoring tools to optimize energy consumption. This supports both operational efficiency and sustainability goals.
- **Monitoring and Predictive Maintenance:** Leveraging its automation and SCADA expertise, Commwork can integrate AI-driven monitoring systems that continuously analyze data center performance, predict potential failures, and trigger automated maintenance workflows.

Commwork's integrated approach ensures that every layer of the airport's digital ecosystem — from field devices to the data center — is optimized for AI-driven transformation, supporting smarter, safer, and more efficient airport operations.



Project Timeline



Commwork ICT takes full responsibility for every stage of airport ICT infrastructure projects — from concept design and system architecture to implementation, integration, testing, and the ORAT phase. With a highly experienced team of engineers and specialists who have successfully delivered numerous airport projects both domestically and internationally, the company ensures that each solution meets the highest standards of reliability, performance, and compliance. Commwork ICT's expertise covers all critical systems, including ICT, security, SAS, and automation, providing seamless coordination and technical excellence throughout the entire project lifecycle.

Case Studies



Commwork ICT
Information & Communication Technologies



15+

Years of Experience

With over **15 years of dedicated** service, Commwork ICT has successfully delivered **innovative ICT solutions** for airports worldwide, establishing a reputation for excellence in the industry.



Istanbul Atatürk Airport

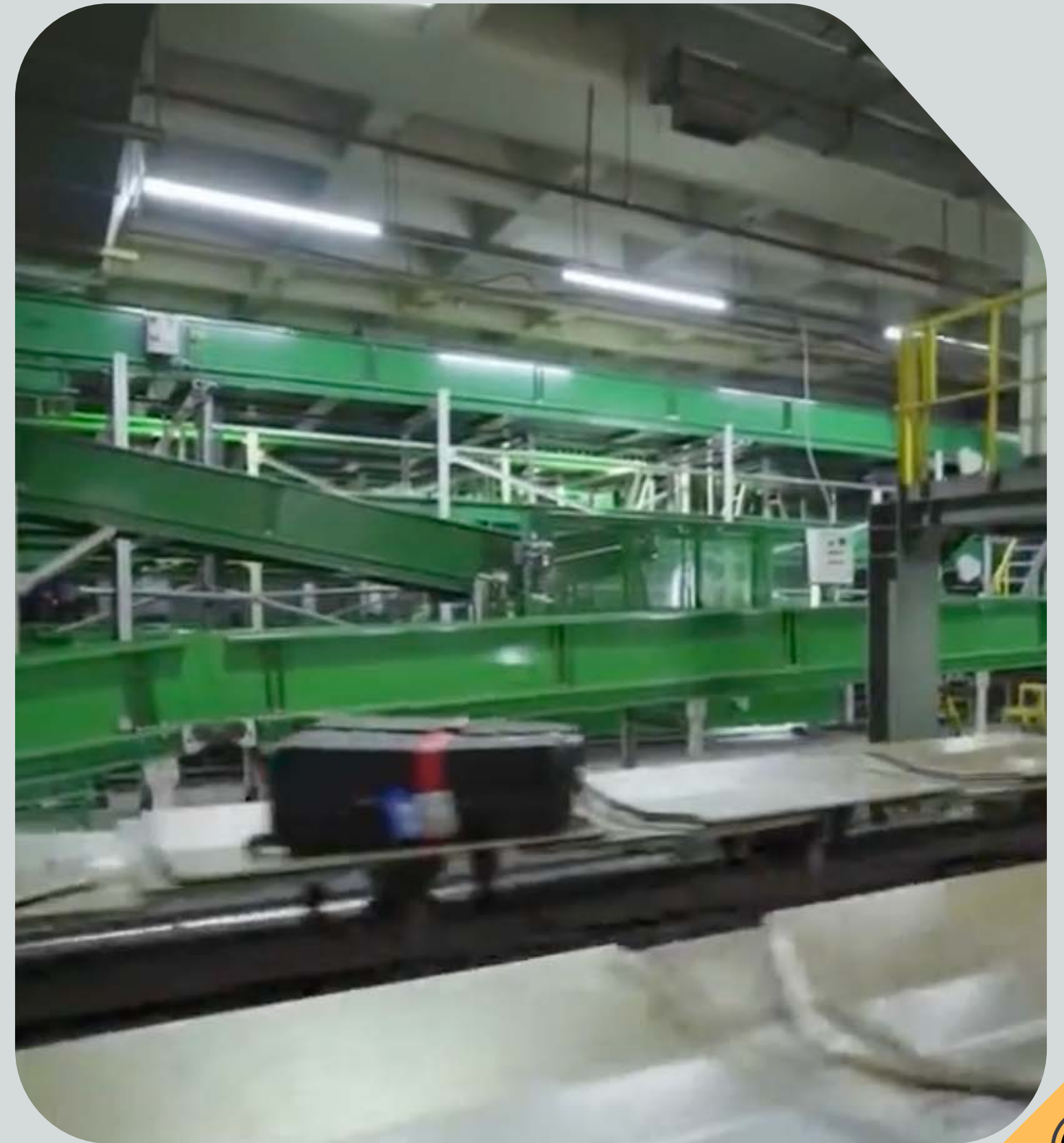
BHS Systems Extension - 2016

Employer: ALSTEF

Scope: BHS automation system expansion
and integration with the existing system.



ALstef



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Istanbul Airport

ICT,SEC and SAS Infrastructure - 2017

Employer: IGA

Scope: Concept ICT, Security and SAS infrastructure design for the terminal building, ATC tower, and AWAN at Istanbul Airport have been completed.



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Istanbul Airport

ICT,SEC and SAS Infrastructure of
DUTY FREE Campus - 2017

Employer: UNIFREE

Scope: Concept ICT and Security systems
infrastructure design for the terminal duty free
management offices and commercial areas at
Istanbul Airport have been completed.

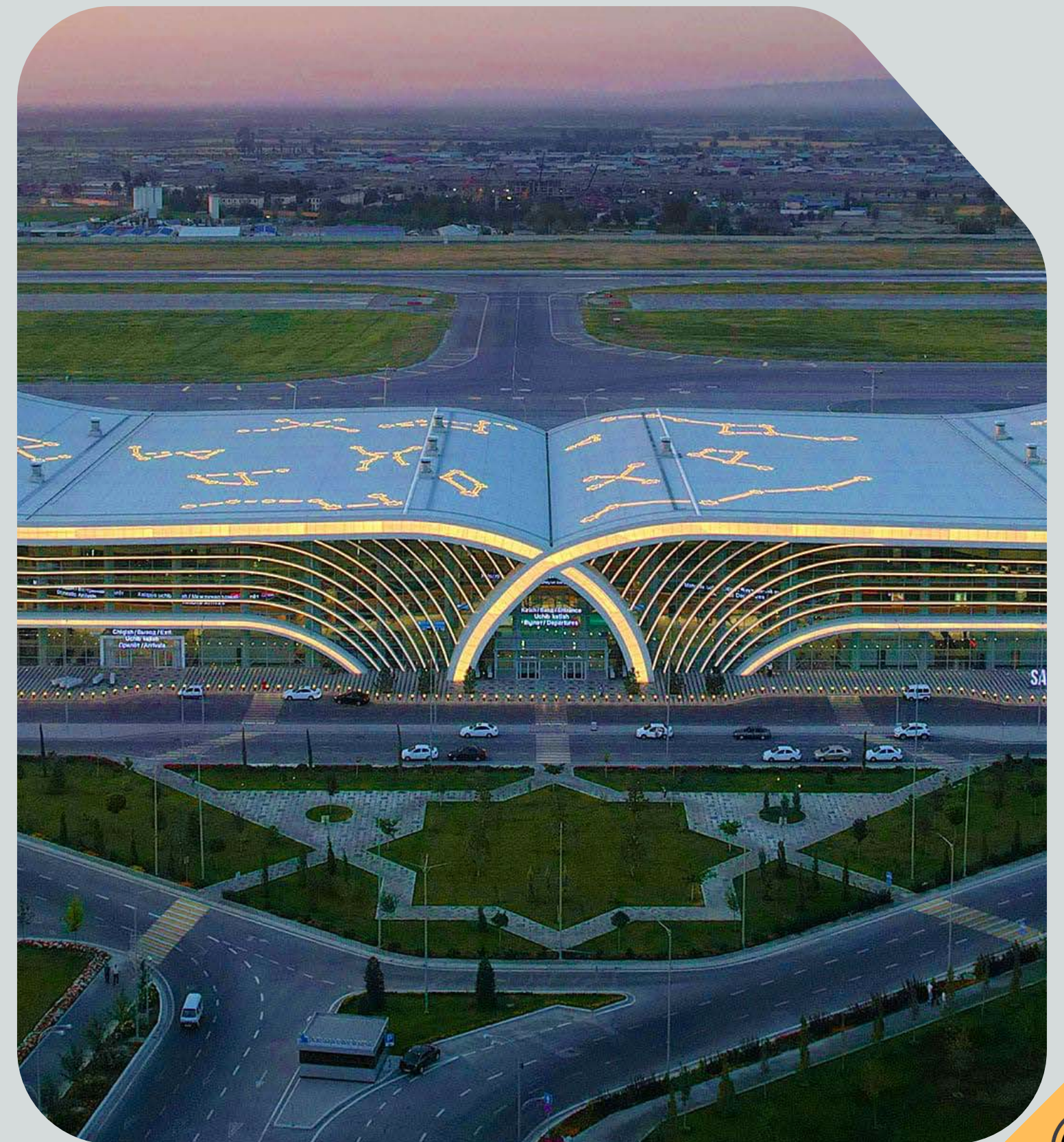


Samerkand Airport

ICT,SEC and SAS Infrastructure - 2020

Employer: Kiklop Architects

Scope: Concept ICT, Security and SAS infrastructure design for the passenger terminal building at Samerkand Airport have been completed.



Tashkent Airport – ATCT

ICT, SEC and SAS Infrastructure – 2020

Employer: Kiklop Architects

Scope: Concept ICT, Security and SAS infrastructure design for the ATC Tower at Tashkent Airport have been completed.



Kuwait International Airport

Security Consultant – 2021

Employer: LIMAK

Scope: Consultancy Services and conceptual design works for Airport Security Systems, Security Zones, and Airside – Landside Separation.



Antalya Airport

ICT,SEC and SAS Infrastructure – 2023

Employer:TAV

Scope: Concept ICT, Security and SAS infrastructure design for the terminal building, ATC tower, and AWAN at Istanbul Airport have been completed.



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King Salman International Airport

ICT, SEC and SAS Infrastructure - 2024

Employer: Jacobs

Scope: Concept ICT, Security and SAS infrastructure
RIBA3 and RIBA4 design for the Iconic terminal building, ATC tower, Private Aviation Building and DMP at KSIA.



Jacobs



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Gia Binh International Airport

ICT, SEC and SAS Infrastructure - 2025

Employer: AAC

Scope: Concept ICT, Security and SAS infrastructure
RIBA3 design for the terminal building, ATC tower,
Private Aviation Building and facility building at GBIA.



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