

Airports of the future

- ◆ Smart
- ◆ Tailor-made
- ◆ Emission Free

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Consulting Engineers

Efficient airport operation is paramount for capacity management, terminal service levels, passenger comfort and satisfaction, or revenue generation. In addition, airports increasingly play their role towards a more carbon neutral aviation.

Tailor-made airport infrastructure is the basis for successful and sustainable airport operation. Only individual design solutions and fully integrated systems allow airport companies to meet the needs and requirements of passengers, airlines, and any operational and commercial stakeholders. Deerns delivers in-depth

knowledge of the entire airport ecosystem. We combine process and system design with our expertise in delivering smart sustainable building concepts. Be it complex and integrated operating and building management systems, or special infrastructure requirements, our objective is designing for optimum

resource allocation, hassle-free and comfortable passenger journeys, return on investment, and most sustainable aviation infrastructure.

Here's where the most sustainable and fully integrated solutions, landside or airside concepts come to life.



Your Partner for Airport Special System Design

Deerns is a leading design and engineering consultancy focusing on building services and airport special system design and integration, building physics, energy efficiency and infrastructure sustainability.

Supporting architectural concepts and operational parameters we ensure that our engineering solutions serve and solve specific objectives.

We partner in all design stages from feasibility concepts to detailed design and consequently in procurement processes, construction supervision, as well as testing and commissioning.

High Calibre Team Work



Deerns works directly with airport companies or in goal-oriented design teams. Independent of the organisational set-up we support specific design objectives, fully integrating into complex team structures, chosen collaboration methods, and project related ICT requirements.

Independent of manufacturers, vendors and contractors we ensure solutions meet our clients' objectives and business needs.

Committed and building our experience & expertise on long-term business relationships we support our clients in successfully completing their projects on time and on budget.

Airport Building Services

Designing airports is complex, requiring design for purpose



Stringent legal regulations and airline demands along with increasingly sophisticated passenger expectations require the ongoing adaptation of airport infrastructure. We support airport owners, operators, architects, or contractors managing these complexities. Forward thinking, we build on our extensive experience in completing efficient, sustainable, comfortable and safe airports worldwide.

Airport design is the pulse of airport operation and requires comprehensive knowledge of all airport processes and systems. Deerns is uniquely positioned through our thorough understanding of all aspects of airport infrastructure & operation. We transform technical and operational requirements into integrated, efficient, sustainable, and cost-efficient designs.



Building Services

Deerns designs mechanical and electrical installations for buildings that are healthy, comfortable, sustainable and safe.

Our designs are based on our extensive and long-term experience in airports and the integration of cross-divisional expertise and knowledge from various other markets in which we are operating: Complex real-estate and high-rise buildings, shopping centres, hospitals, data centres or clean-tech and laboratories.

Creating innovative and well-planned concepts that prioritise energy efficiency and operational flexibility at minimal cost, we use advanced software for the full integration of installations and architectural design. With engineering and design of building services and technical systems as our core competence, computer simulations guarantee that the design performance parameters are met.

Every airport terminal requires tailored solutions. We analyse the particular characteristics and requirements before designing location specific solutions that integrate into complete concepts. In doing so, open cooperation and communication with the architect is key to success. For example, in the post-covid era, clean and generous supplies of low-velocity fresh air are fundamental but require adequate spatial planning.

The ever-growing number of ICT systems to support airport and terminal operation requires a resilient ICT infrastructure backbone. We design reliable and secure networks, for scaling capacity and connectivity for operational systems and passenger convenience.

Functional planning in early stages achieves desired levels of flexibility for future expansions. In-depth knowledge of regulatory frameworks and operational processes supports optimum passenger and baggage flows. Our understanding of the technical requirements for plant and back of house areas to be integrated into bold designs helps buildings to become truly iconic.

- Mechanical (HVAC)
- Electrical (power supply, lightning protection)
- Plumbing (water, sewage)
- Fire Safety (fire suppression, fire alarm, evacuation)
- Building security (access control, CCTV)
- Telecommunication networks (cabled network, Wifi)
- Transportation systems (elevators, escalators, moving walkways)
- Building Management Systems

Building Physics

Designing comfortable, healthy and low-energy buildings goes beyond clever and well-integrated installations.

Deerns' extensive knowledge in building physics helps to create truly pleasant and comfortable spaces, architecturally and atmospherically.

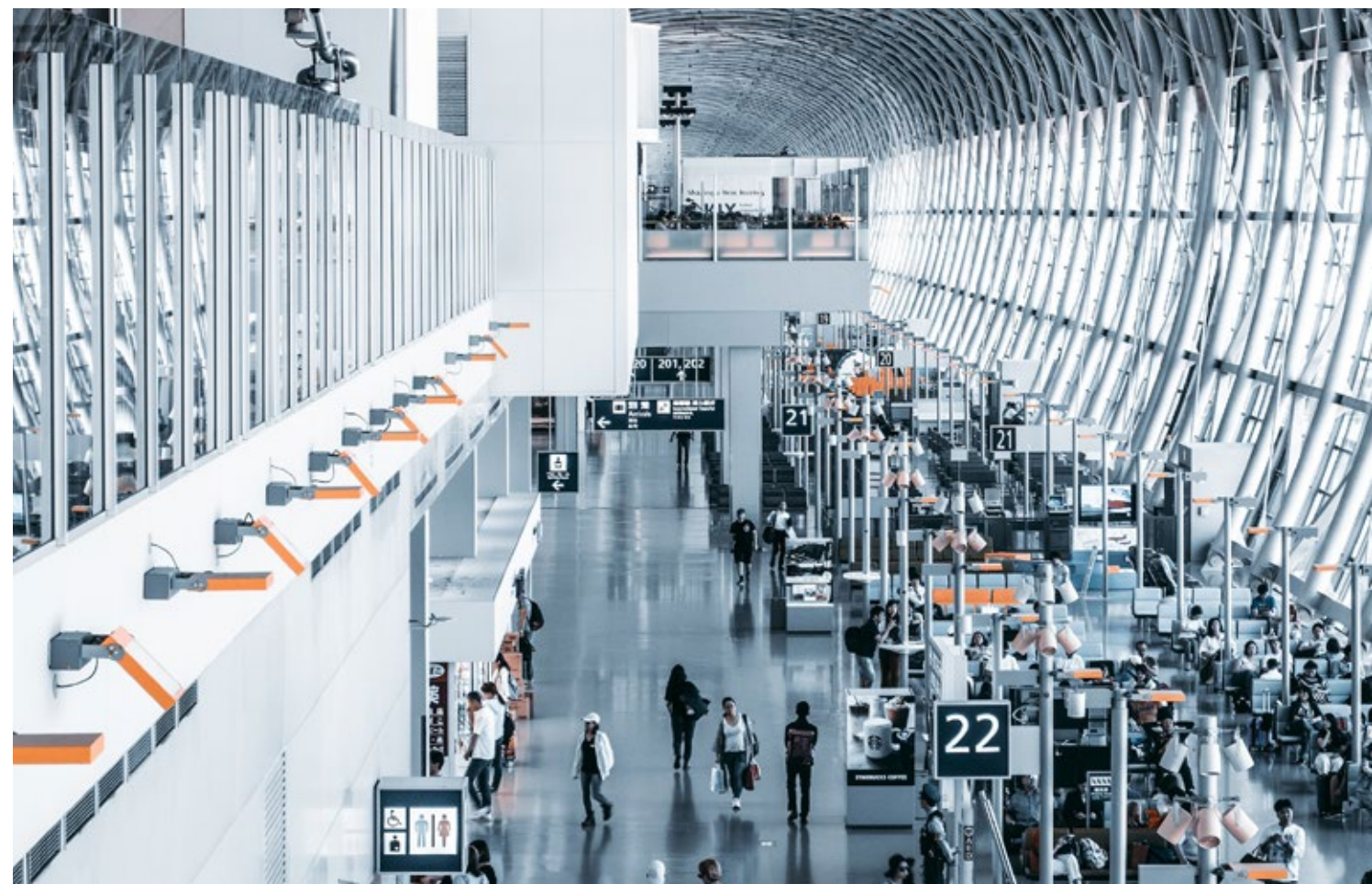
Building shape, orientation, or envelope, the effects of conceptual decisions on building comfort and energy consumption can be estimated already in pre-design stages. In later detailed and final design phases, the focus shifts to applied materials and

accompanying in-depth studies, like thermal modelling. Such ensures the design of an energy efficient building and prevention of costly changes at later stages.

From the passenger comfort perspective, large interior spaces, high ceilings or extensively glazed façades are common challenges in airport design. Guaranteeing building comfort and functionality in an energy-efficient and cost-effective manner requires

innovative engineering solutions for terminal buildings of all sizes. This is why we deem building physics as an essential and integrated part of building design.

- Acoustics
- Simulations (CFD, dynamic energy, sunlight)
- Façade technology
- Light design and light architecture
- Thermal comfort
- Ventilation and air quality



Airport Special Systems



**Airports of the future
are smart, tailor-made
and emission free**

Deerns airport special systems design and engineering supports the processing of passengers and baggage, aircraft ground movement and handling, aeronautical navigation or meteorological surveillance. These systems enable equipment and facilities for efficient airport operation.

We are unique and a leading consulting engineering firm in defining these systems due to our in-depth knowledge in all facets of airport planning, engineering and design.

With our solid track-record in projects worldwide we ensure clients receive solid, efficient and compliant design solutions in a constantly changing and dynamic environment.



Terminal

The terminal building is the most complex and critical piece of airport infrastructure design. An airport's success is strongly determined by carefully designed passenger, baggage and logistic flows, attractive and comfortable dwell and commercial areas, as well as perfectly integrated underlying operations and management systems.

Technological progress continues to play an increasingly important role in terminal design and operations. Growing technical complexity also has an impact on architectural terminal design. Our experience and expertise in airport terminal systems is the link between infrastructure design and efficient operation.

We deliver comprehensive solutions and an integrated design including all interfaces. Simultaneously we translate any system-specific development strategy into the specific requirements for the architectural and MEP designs.

- Airport operational and information systems
- Airport passenger and baggage handling systems
- Audio-visual communication and public announcement systems
- Mobile coverage (indoors)
- Security screening
- Logistic studies (flow simulations, lift simulations)



Apron

Apron layout is of integral relevance to safe and efficient airport operations as the link between the terminal building and the airfield. From the design perspective it is the interface between creative architects and functional driven civil engineers.

Our apron design facilitates the operation of aircraft fleet mix and ground service equipment, and provides the flexibility to cope with future expansions or any changes in airport operations. Involved in special airport systems design for terminals and airfields, we integrate all aspects of apron design, always offering solutions to minimise aircraft and other servicing equipment emissions.

- Aircraft stand design and simulation
- Passenger boarding bridges
- Aircraft ground handling systems (400Hz, pre-conditioned air etc.)
- Hydrant refuelling
- Apron floodlighting
- Visual Docking Guidance Systems (VDGS)



Airfield

The optimum design of critical and supporting systems is essential for safe and efficient airfield operation. Deerns advises on technical design and engineering; from airfield ground lighting and navigational aids to meteorological systems and ATC Tower design.

Our strong understanding of the highly regulated aeronautical navigation and ground operation surveillance industry supports safe and streamlined operations, the strict adherence to procedures, and equipment reliability. Stakeholder management is essential to align the varying

interests of airport operator, civil aviation authority, ATC provider or meteorological departments. Our consulting engineers understand each stakeholder's needs and regulatory general parameters and deliver integrated solutions for each individual project demand.

- Aeronautical ground lighting and signage
- Navigation and landing aids
- Ground control (incl. A-SMGC) and surveillance
- Air traffic control and communication
- Meteorological facilities

Airport Systems Integration



Strategic Advisory

Successful airport development is based on a consolidated development strategy. Master planning traditionally involves the optimisation of spatial, functional and economic aspects of airport development. The supply strategy for energy and utilities must reflect the long-term infrastructure development on master plan level. Sustainability goals can only be achieved by maximising circularity for energy and water.

From initial concept to real site supervision and commissioning, Deerns assists airports in their strategic challenges in small and large projects. Feasibility studies of utility concepts, the definition and dimensioning of utility plants, or the positioning of supply corridors and service galleries, contribute to efficient and integrated airport infrastructure management, cost-efficiency and sustainability.

Our track record and methodology are based on operational expertise, ensuring a smooth project and solid results.

- Utility master planning
- Energy supply and circularity
- Maintenance concepts and due diligence
- Sustainability master plan and road map
- Business case and cost-benefit assessments



SMART Airports

SMART airports entails digital asset management, enable new revenue flows and provide a stream of new possibilities for monitoring, analysing and optimising every aspect of airport management.



Efficient Operations

Smartness is more than a sum of connected technologies such as IoT devices, GPS and sensors. In SMART airports the application and integration of technology serves airport management, operation, revenue generation and utility reduction. They exploit connected technologies to perform planning and operations tasks digitally and support operational staff thereby optimising passenger flows and the activities of the airport staff across the premises.



Sustainable

Translating operational requirements into a precise resource allocation airports to can map their decarbonisation journey by reducing energy consumption and emissions.



Profitable

Airport companies attain detailed insights of their business enabling predictive and planned maintenance, minimising unexpected failures and optimising planned unavailability or temporary replacement of services.

- Smart infrastructure assessment
- Gap analysis and upgrade plan
- Cost analysis

Integrated Infrastructure Sustainability

Airport infrastructure operation is estimated to account for up to 10% of total carbon emissions in civil aviation. Although minor compared to greenhouse gas emissions caused by aircraft and other ground handling operation, airports can – and must – contribute their part to transform civil aviation into a zero-emissions business.

Our integrated sustainability services for airport infrastructure operation deliver a comprehensive strategic approach reducing carbon emissions.

We found this on two pillars, namely our:

- broad relevant experience from other markets, such as commercial real estate, health care, electronics, life sciences and data centres.
- cross-divisional expertise in sustainability relevant engineering services, such as energy supply and transition, building physics, façade design, or the integration of advanced technologies and IT-systems.

Ahead of providing tangible solutions, we work with clients to formulate their strategy towards zero-emission and energy neutral operations. Success is a function of clearly defined ambitions, realistic goals and objectives, and transparent estimates of costs and benefits. Upon this foundation we swiftly proceed with defining specific measures, implementing required technical solutions, and monitoring the correct performance.

SMART airport concepts support the optimisation of sustainable facilities and operation. Automatised and focused resource allocation, detailed data collection, tailor-made analytics and operating concepts lead to further sustainability gains and cost efficiencies.

Deerns doubles down on achieving sustainable and decarbonised airport by providing or advising on:

- Energy supply assessment and transition roadmaps
- Alternative energy sourcing, renewables
- Assessment and analysis on energy use and building envelope
- Smart heating networks
- Active energy reduction (installations, controls etc.)
- Passive energy reduction (materials etc.)
- Smart building operation
- Climate adaptation and communities.

About Deerns

Deerns is a leading international consultancy and engineering firm and specialises in the design and optimisation of installations for high performance buildings for people and industries to thrive. Our consultancy and engineering services cover the entire lifecycle of buildings.

We create healthy, sustainable, smart and future-proof solutions in the following markets: Airports, Real Estate, Health Care, Life Sciences, Electronics and Data Centres. Our high-quality services range from strategic consulting, system design and specialist engineering to sustainability advice and digital roadmaps. Our 550+ experts in mechanical and electrical design (MEP), building physics, energy efficiency digitalisation and sustainability are committed to make their work count.

Airports of the future

Airports of the future



With a track record of over 500 projects at over 50 airports worldwide. Established in 1928, Deerns has been developing airport design and engineering expertise in more than 350+ projects together with Schiphol International Airport since the 1970s.

Deerns accompanies airport operators, architects or engineers and contractors through all stages of airport development or reconstruction projects, adding value in all project phases, from feasibility study to commissioning, for greenfield airports as well as for refurbishment projects under full operation.

Deerns is doubling down on decarbonisation to transform the civil aviation industry into a zero-emission industry. We combine our knowledge and design capacity for building services, building physics and energy supply to reduce energy consumption and optimise circularity.



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