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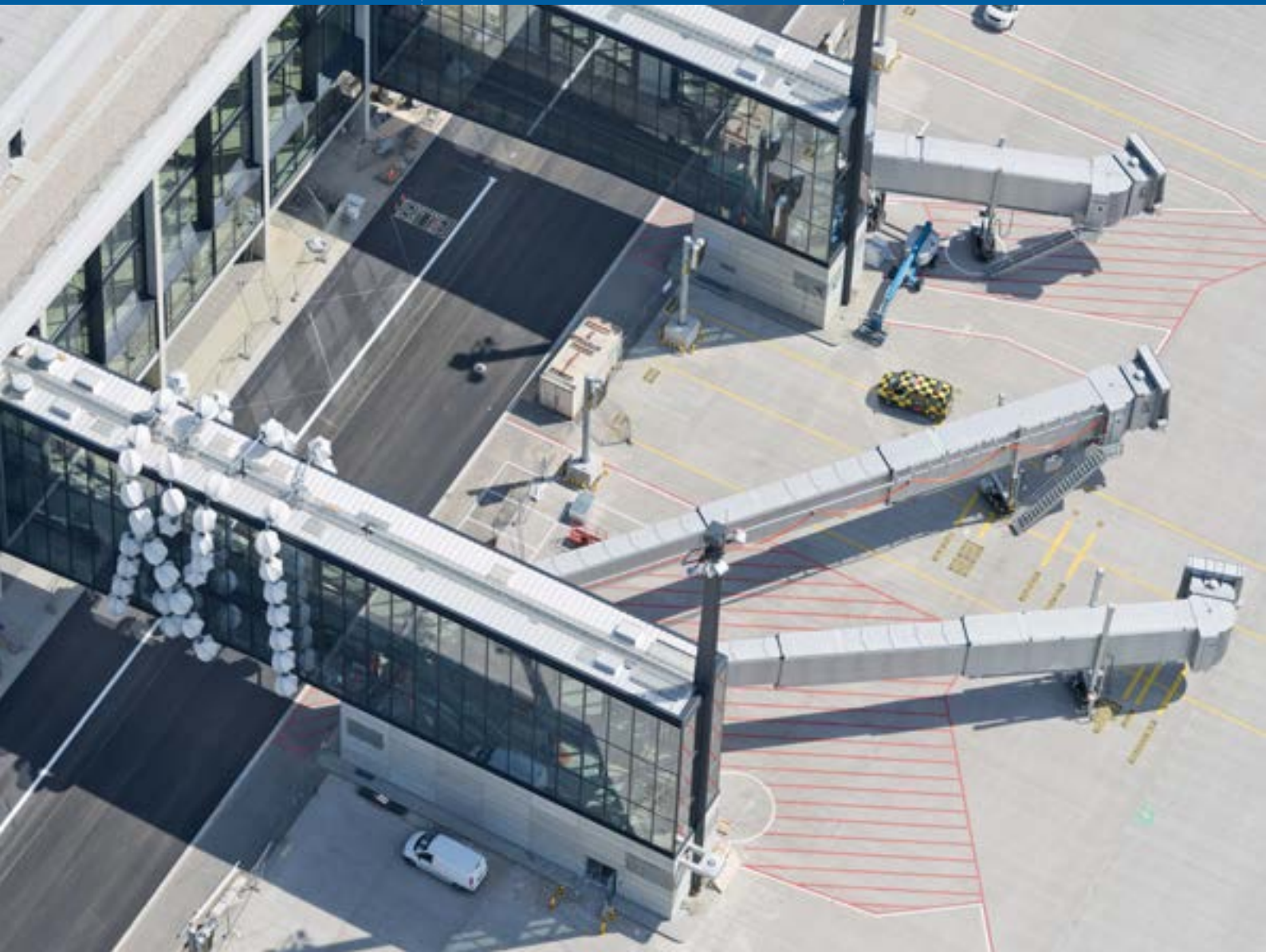


advanced  
airport solutions

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# airsight

## Selected Projects

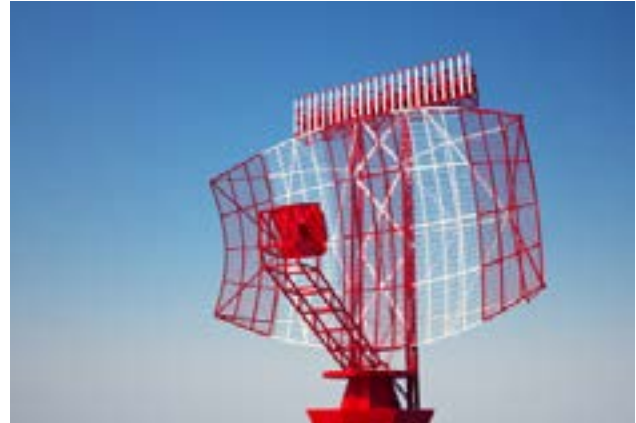


# airsight projects

## Brussels International Airport Technical Study on ATC System interferences with new constructions

New Buildings or other obstacles may cause disturbances on the Air Traffic Control (ATC) and Communication, Navigation and Surveillance (CNS) equipment signals, and have a negative impact on aerodrome operations – notably in terms of safety. Therefore, prior to new constructions, a specific desktop study is required to assess the impact of new buildings on ATC CNS systems.

airsight assisted Brussels International Airport to assess the impact of new proposed rescue and firefighting buildings on CNS facilities such as ILS, VOR, DVOR and radars. For this purpose, qualitative analysis and numerical simulations were conducted, taking into account existing and new buildings, type of runway operations (CAT I or CAT III), as well as construction equipment (e.g. cranes and moving objects).



As experience shows, such desktop studies are very reliable and can facilitate the development of new construction projects in the aerodrome vicinity, while avoiding too costly measures (design revisions, relocation, or reorientation).

Services: [CNS Assessment](#)



## Luxembourg Airport Precision Approach Path Indicator relocation study

As required by ICAO and EASA, a Precision Approach Path Indicator (PAPI) is required for Code 3 or 4 runways used by turbojet aircraft.

The main safety objective of such a system is to provide information to pilots on the approach angle necessary to maintain a safe height over obstacles and threshold.

In order to provide a correct visual indication, the relative position of the PAPI to the threshold needs to be precisely positioned and the system well calibrated.

The Administration de la Navigation Aérienne (ANA), responsible for Luxembourg Airport's air navigation equipment, commissioned airsight to determine the optimal relocation of the existing PAPI within a runway rehabilitation project. For this exercise, numerous criteria were taken into account e.g. critical aircraft type, minimum wheel clearance – and eye height – over threshold, achievable harmonisation with ILS signal slope, obstacle situation, ground and runway elevation profile, etc.

Services: [Airport Planning](#)

# airsight projects

## Groupe ADP - Paris Charles De Gaulle Airport Runway pavement inspections using drone

Groupe ADP is a pioneer in the utilisation of drones at its airports, e.g. for the inspection of terminal buildings or for the calibration of air navigation equipment. So far, for practical and safety reasons such flights within the airside area of the airport were limited to tethered operations only, where the drone is tied to the ground via a leash.

In August 2016, ADP selected airsight to conduct the first large-scale inspection of Paris Charles De Gaulle Airport (CDG) using an untethered drone. This mission had for overall objective to determine if drone-based pavement inspections, as developed and already in use by airsight at German Airports since 2015, could be used in the future in conjunction with conventional on-site visual inspections performed by Groupe ADP personnel driving the runway.

Prior to the inspection, an operational concept and safety case were developed and validated by ADP, the local Air Navigation Service Provider “SNA-RP” and airsight, to integrate safely the missions within airport operations.

During the inspection, a surface of more than 200 thousands square meters was captured – almost 30 soccer fields. To minimise impacts on capacity, the overall net flight time of approximately 1 hour and 45 minutes was split into nine

individual flight segments, to take advantage of periods of lower traffic. Thanks to a proper mission preparation, a comprehensive support of Groupe ADP and a close collaboration with air traffic control, the maximum runway occupancy time for a flight segment was 18 minutes. This includes the time required to enter and exit the runway, obtain ATC clearances as well as for conduction of final FOD checks after each drone flight.

As a next step, all gathered data were post-processed at airsight’s premises in Berlin to create a geo-referenced image of the runway with an extremely high resolution.

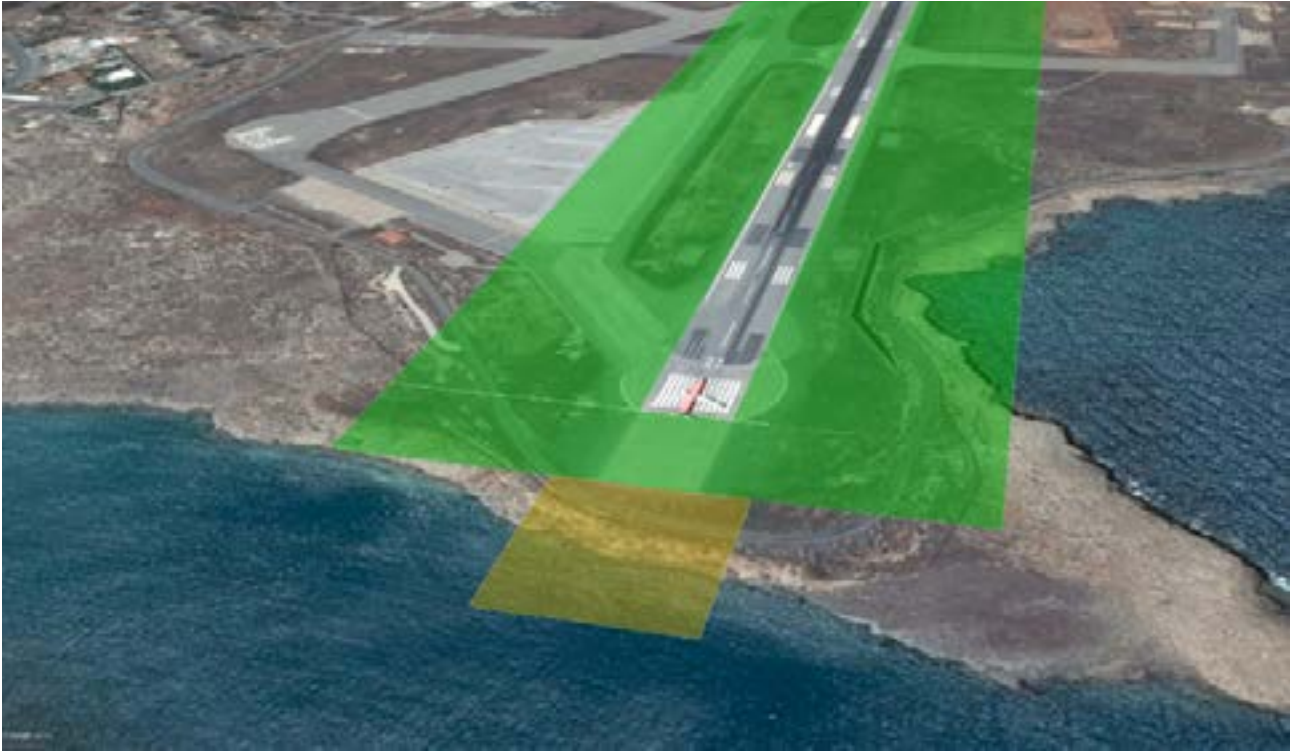
This served as a basis for a detailed assessment of the runway’s pavement conditions, which was documented in form of a report and associated interactive maps containing all identified distresses, taking into account relevant requirements of ICAO and EASA and other international standards. This analysis and subsequent preventive maintenance actions enabled the Airport operator to extend the lifetime of the pavement, reduce cost, and increase safety for operating aircraft.

Services: UAV-based Pavement Inspections





# airsight projects



## Safety Assessments for non-EASA/ICAO compliant Runway Strip

Numerous airports have several deviations related to the provision of a Runway Strip. Most common deviations are non-frangible objects (buildings, antennas), parallel taxiways or tunnel entrances, fences, public roads or significant slopes in the strip. Above that temporary works involving construction equipment in the strip may cause safety issues.

A runway strip – and its graded portion – aims to “reduce the risk of damage to aircraft running off a runway, and to protect aircraft flying over it during take-off or landing operations” (ICAO Annex 14). Further requirements are introduced by ICAO Aerodrome Design Manual and EASA CS ADR-DSN (e.g. safe use by rescue and firefighting vehicles). On top of that, a large number of national regulations exists: German regulations - for instance - are more permissive than many others to allow construction works in some parts of the non-graded portion of the runway strip (provided that specific conditions are fulfilled).

airsight assisted in the last few years many airports and Civil Aviation Authorities in managing deviations from the above mentioned requirements, conducting on their behalf Safety Assessments and developing mitigating measures to reduce the risks following to the ALARP principles (As Low As Reasonably Practicable) when necessary.

airsight developed and maintain for such exercise a risk-model to quantify the probability of lateral excursion of an aircraft from the runway during take-off and landing. It enables the assessment of the individual risk level for different scenarios based on the local characteristics of each airport (e.g. type of approach, traffic mix, location of obstacles, etc.).

This “safety-based” approach, compliant with aviation regulations, enables airport operators to make informed decisions on the infrastructural or operational measures required to mitigate risks if necessary. Often this approach considerably reduces the investment required to ensure an acceptable level of safety when “full” compliance with infrastructure requirements is not possible or feasible.

Services: Aeronautical Study

# airsight projects

## Aeronautical Study of service drive in pre-threshold area of a runway

Ground service vehicles crossing an operational runway at an airport can be hazardous and can cause aircraft and vehicle delays as well as severe operational constraints.

At a large international European airport, a service road linking apron and supply areas crosses the secondary runway at the threshold. To avoid long waiting times and operational limitations, a new service drive is proposed in the pre-threshold area of the runway. The objective is to allow vehicles to drive around the threshold independently for a major fraction of aircraft operations on the runway.

Designing a service road in a pre-threshold area is a challenging task as it requires fulfilling numerous restrictive infrastructural and operational requirements. Therefore, airsight was commissioned by the airport operator to carry out an aeronautical study, assessing the feasibility of the concept.

The study was conducted in compliance with international regulations of ICAO and EASA. Based on the concept and its relevant processes, hazards have been identified and associated risk as well as their potential impact on

operations have been analysed, focussing in particular on jet blast and RESA related issues. Where required, mitigation measures have been proposed.

In order to partially allow independent operations of the service drive and runway, a “dynamic Obstacle Limitation Surfaces” (OLS) concept has been developed. Instead of being “static” and based on the most critical aircraft, dynamic OLS are based on the size of the aircraft operating on the runway. This approach enables a more flexible and less constrained utilisation of the service drive, as the affected runway is operated mainly by small aircraft.

The aeronautical study enabled to demonstrate that with the help of such a concept, in conjunction with new ATC procedures and associated mitigating measures, the service drive can be operated safely while minimising the impact on airport capacity.

[Services: Aeronautical Study](#)



# airsight projects



## Company Flight Procedures (RNAV) to regional airports in Africa

Airlines greatly benefit from the utilisation of area navigation (RNAV) approach procedures. Reducing the chances of controlled flight into terrain, it increases safety. In addition, it makes the approach easier to fly.

Nevertheless, while the availability of RNAV procedures is increasing, numerous aerodromes in developing countries still do not have developed nor published RNAV procedures.

To still benefit from RNAV at aerodromes where no such procedures are available, airlines can contract independent Flight Procedure Design organisations to develop so called “Company Procedures” for them. These procedures are designed, charted and coded into the fleet’s Flight Management System, as well as validated by the responsible aviation authorities – the only specificity is that these are not published in the aerodrome AIP.

In addition to providing Flight Procedure Design services to aerodromes and Air Navigation Service Providers, airsight designs instrument approach procedures also for commercial airlines, such as Air Austral. This airline, based in La Réunion, operates at several small regional aerodromes in Europe, Asia and Africa and commissioned RNAV procedures design to airsight in order to fully benefit from Global Navigation Satellite Systems (GNSS).

Services: Flight Procedure Design

## Planning of new Heliport at an International Airport in accordance with ICAO/EASA

A major European Airport, facing the necessity to relocate and expand its existing heliport, commissioned airsight to conduct a selection study for the new site and develop a first master plan and operational concept for the new main facilities – in-line with EASA requirements.

The core element of a heliport is its Final Approach and Take-Off Area (FATO). Designing a FATO is a complex iterative exercise, notably at large international airports where space is a scarce resource and any impact on runway and taxiway operations should be minimised.

Services: Heliport Planning and Design



# airsight projects



## Development of requirements for drone operations at aerodromes

According to a recent survey, more than 25% of the interviewed airports already had experience with drone operations for applications such as asset surveys, pavement inspections, visual landing aid calibration (PAPI), aircraft maintenance inspections, promotional videos etc.

The demand for drone operations at aerodromes is continuously growing, but many operators are facing some difficulties, as there is often no standardised approach nor safety case to enable flights over runways and taxiways, aprons and aircraft stands, passenger terminal buildings, etc.

Drone operations at or around aerodromes are subject to special conditions, but in most cases these conditions are simply not yet defined by the aerodrome operator or responsible authorities. Often, this leads to a systematic rejection of all drone operation applications, non-commensurate rules, or generates a lot of efforts to review the applications on a case-by-case basis.

An aerodrome operator commissioned airsight to develop a clear set of rules for operating drones at and in the vicinity of its airports.

airsight, as aviation safety consultant with experience as drone operator, developed these rules using a risk-based approach. After a review of possible hazards, different fly-zones were introduced, based on the risk operating a drone in these zones represents to aerodrome operations as well as taking into account other requirements (e.g. obstacle limitation surfaces, ATC CNS equipment etc.).

Then, specific minimum conditions were defined for each zone, following the principles that the high-risk zones shall have the highest standards in terms of Concept of Operations, Personnel Requirements, Operating Environment (visibility, wind and temperature conditions), Technical Requirements and Operating Procedures.

Such clear sets of rules are specific to an aerodrome and shall also take into account the national regulatory framework. These define under which special conditions drone operations are possible, and greatly improve transparency between stakeholders (aerodrome and drone operators, air navigation service provider, regulator and responsible authorities etc.).

[Services: Safety Case Development](#)



# airsight projects



## Aeronautical Study for bulk-fuel storage tanks in the vicinity of active runway

New facilities in the vicinity of aerodromes can represent a physical obstacle which could possibly infringe Obstacle Limitation Surfaces. To maintain the necessary level of safety, permanent monitoring and assessment of any infringements or changes to airport operations are required.

airsight has carried out an aeronautical study for an international aerodrome where new bulk fuel storage tanks are proposed to be located close to existing facilities (hangars and maintenance buildings) and near an active runway and approach path. As the proposed facilities represent a change at the aerodrome, an aeronautical study is required as per ICAO / EASA regulations.

The purpose of an aeronautical study is to provide a systematic evaluation and assessment to ensure that the safety of flight and airport operations is not compromised. The applied methodology is based on European Aviation Safety Agency (EASA) and International Civil Aviation Organization (ICAO) guidelines.

Based on the results of a hazard identification exercise related to possible infringements of applicable surfaces as prescribed in ICAO Annex 14 and PANS-OPS, a risk

assessment was performed determining the risk of collision between an aircraft and the proposed facilities using statistical models as well as experts' opinions and workshops.

For such a complex infrastructural project, a range of factors has to be considered. While some aspects related to CNS compatibility, secondary events and special emergency procedures were managed by the aerodrome operator itself, airsight focused on the impact of the new facilities and its construction (cranes) on instrument or visual flight procedures in compliance with EASA and ICAO requirements, and associated risk of collision.

The study enabled the proposed construction to go ahead, provided certain conditions are met and mitigating measures implemented.

Services: Obstacle Assessment, Aeronautical Study



# airsight projects



## Several Airports Safety Cases for flexible contingent runways

Over the last few years, some single runway airports have converted a parallel taxiway into a secondary runway. The most famous example is Gatwick Airport: the northern runway (08L/26R) was initially a taxiway. Today, it is declared as a runway and can be used as such when the main runway (08R/26L) is not in use for any reason (e.g. maintenance, emergency). In “normal” operations, it is simply used as a taxiway, as the two runways cannot be operated in parallel. The time required for changing over the configuration is only two hours.

Such practice, not defined by ICAO, is referred to in the industry as “switch-on/switch-off runway”, “flexible contingent runway”, or “temporary emergency runway”. It is very convenient when infrastructural development is limited. It enables extensive maintenance works to be carried out on the main runway without having to reduce scheduled operations or to close down the airport.

Nevertheless, such practice is extremely complex to introduce and manage. It requires important infrastructure adaptations, very precise procedures as well as a solid safety case to demonstrate that the concept can be operated safely.

airsight participated in the development of numerous such safety cases, together with airport operators, air navigation service providers, airlines and authorities.

The main difficulty of such project resides in the management and mitigation of risks of confusion, runway incursion, ATC errors as well as risks related to the transition between the runway configurations.

Furthermore, in many cases, a taxiway cannot be fully upgraded to a runway, both in terms of infrastructure and equipment. If compliance cannot be fully achieved, a safety-based approach is required to manage non-compliances, or to prioritise the elements to be upgraded, e.g. runway guard lights, stop bars, markings.

To conclude, a flexible contingency runway may be considered in case no other options for continued operations are available. It can be operated safely, but is associated with numerous restrictions and a comprehensive analysis of risks involved.

# airsight projects

## Several Airports

### Runway holding positions and obstacle limitation surfaces

Aircraft taxiing or holding too close to the runway may endanger airport operations. Therefore, as per ICAO/EASA, “the location of a runway-holding position shall be such that a holding aircraft or vehicle will not infringe the obstacle free zone, approach surface, take-off climb surface or ILS/MLS critical/sensitive area or interfere with the operation of radio navigation aids” (see ICAO Annex 14 6th Edition, Standard 3.12.3 or analogously GM1 ADR-DSN.D.340 of EASA CS-ADR-DSN, Issue 2, 2015).

In order for aerodromes to fully respect this standard it requires a very precise planning of the location of the holding position, taking into account the entire aircraft fleet, taxiway system geometric aspects and all approach types. The verification of the compliance of a runway holding positions is therefore a challenging exercise, in which airsight excels and demonstrated its expertise in several projects.

airsight's methodologies and tools makes the positioning of holding positions and the identification of possible infringements very efficient.

Also, in some cases, non-compliances to the applicable specifications cannot be ensured: simply because it is “technically” not feasible due to the lack of space, or because a displacement of the holding positions would have a too negative impact on airport capacity.

airsight is capable of conducting a safety assessment as per ICAO or EASA requirements and to recommend mitigating measures to maintain or achieve an acceptable level of safety.



Services: Safety Assessment, Obstacle Assessment



## Berlin Brandenburg Airport

### EASA compliance assessment of the north runway

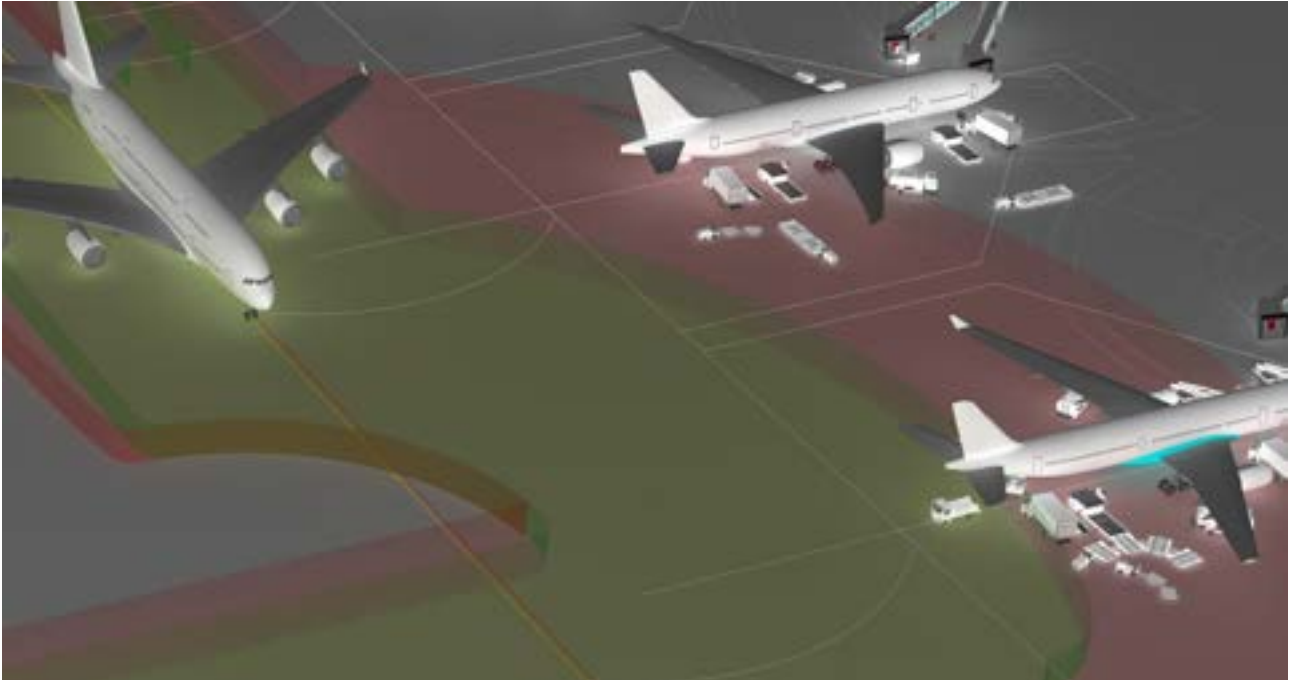
In preparation to a major rehabilitation project of its north runway, Berlin Brandenburg Airport commissioned airsight to conduct an in-depth investigation of the conformity of the existing infrastructure against the most recent EASA Certification Specifications.

In total, more than 140 infrastructural elements related to the runway and associated taxiways have been individually assessed. It included the review of signs, markings, lights, shoulders, and further applicable requirements such as strips, runway end safety area, etc.

Runway rehabilitation projects are generally a great opportunity to solve existing deviations to applicable requirements as well as to optimise the infrastructure and equipment (rapid exit taxiways, fillets, lighting etc.): through the identification of possible improvements and development of efficient implementation strategies, significant synergies and cost savings can be realised.

Services: Compliance Assessment, Airport Planning

# airsight projects



## Several Airports

### A safety-based approach to assess jet blast at aerodromes

The design of an airport movement area must take into account the impact of “jet blast”. For this purpose, planners rely on dedicated software which can display the jet blast contours for different velocities and thrust levels (i.e. idle, break-away, take-off).

Nevertheless, many airports still experience incidents related to unexpected jet blast effects, notably on the apron during taxi operations. Jet blast can blow vehicles, equipment or other objects and cause severe injury to people or damages.

On the other hand, airport planners often state that fulfilling “by design” jet blast limitations are too restrictive. It considerably increases the required safety margins, requires the installation of expensive jet blast fences or the definition of very restrictive operational measures. Planners sometime rather rely on experience than on simulation results or demonstrated values.

A lot of uncertainty remains with regard to the real jet blast related risks.

**How reliable are the jet blast contours provided by the aircraft manufacturers further used for simulation purposes? Which criteria or parameters shall be used for airport planning purposes, in order optimise airside design while preventing incidents and minimising operational limitations?**

These fundamental questions have been asked a lot to airsight over the past few years.

A review of the values provided for different aircraft types

revealed noticeable inconsistencies and major differences between jet blast contours of similar aircraft types. For instance, B737-800 and Airbus 320-200 are almost the same in terms of dimensions, mass and engines – but their breakaway contours diverge significantly (148 vs 29 m)! Similarly, the declared contours for a B747-400 are twice more demanding as for a heavier A380.

The main reason for these differences is that there are no standards to determine jet blast values. Manufacturers’ methods are not comparable and in addition inconsistent between their own aircraft models. Furthermore, specific manoeuvres on the apron (e.g. turns, engine-out operations) are not considered – only a “one-fit-all” value is generally provided.

These facts do not mean that simulations are useless, but show that some more expertise is required as well as a closer examination of the local operational conditions: turns, aircraft mix, possible pilots’ behaviours, procedures etc.

In selecting which contour values to be used at an aerodrome, airsight uses a unique safety-based approach together with more accurate values obtained via different methods (full-flight simulator trials, measurements, consolidated technical research) and considering specific operational conditions and scenarios.

The benefits for aerodromes are a more accurate design and a more efficient space utilisation, less operational restrictions - while maintaining or increasing the safety level.

[Services: Safety Assessment, Apron Planning](#)

# airsight projects

## Auckland Airport

### Review of apron infrastructure and operations

Auckland International Airport (AIA) is facing a significant increase of traffic, combined with a continuous evolution of the aircraft fleet. The apron infrastructure is limited both in terms of available aircraft stand and space, resulting in complex and possibly less efficient operations for all users.

To face this challenge, AIA launched several strategic initiatives aiming to improve the situation. One of these initiatives, commissioned to airsight, was to conduct a comprehensive review of AIA apron infrastructure and operations.

Within the review of the apron infrastructure, airsight airport planners took a fresh look at the apron assets. They proposed several innovative solutions based on best-practices, for instance to create additional available areas for ground handling activities and servicing equipment, to simplify push-back procedures and to decongest taxi operations, to improve compliance with requirements or to provide pilots better situational awareness with optimised markings and signage.

The review of the operations aimed to identify potential opportunities to improve both the safety (including airside discipline) and efficiency of operations. Based on airsight's expertise and more than 20 interviews with key-stakeholders, numerous recommendations were proposed on various topics such as safety management systems, slot and stand allocation, apron management services and ground handling operations.

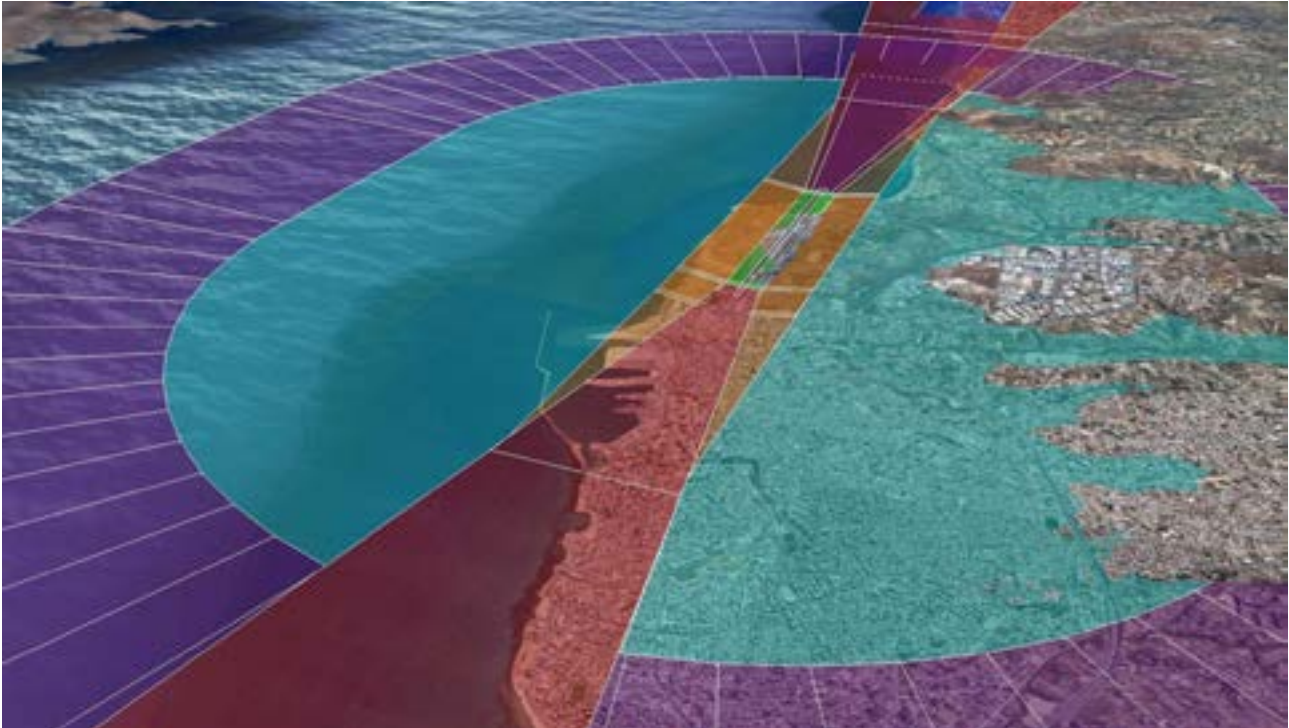
These numerous recommendations ranged in size from simple, low cost solutions that would be tangible in the short-term, up to more significant infrastructure solutions that would be tangible in the medium term.

Services: [Airport Operations](#), [Apron Planning](#), [Airport Planning](#)





# airsight projects



## **The Korea Transport Institute (KOTI)** **Development Of Requirements For Aeronautical Studies Assessing Obstacles**

ICAO regulations defined in Annex 14 specify airspace around aerodromes to be maintained free from obstacles. For that purpose, virtual surfaces called “Obstacle Limitation Surface” (OLS) are described, which ideally shall not be penetrated by an object. Nevertheless – according to ICAO, EASA and many states – penetrations may be acceptable if an “aeronautical study” demonstrates that the object or obstacle has no adverse impact on the safety or regularity of flight operations. This process generally requires a specialised third-party – as airsight – to develop the aeronautical study, which shall be later submitted and reviewed by the responsible aviation authority.

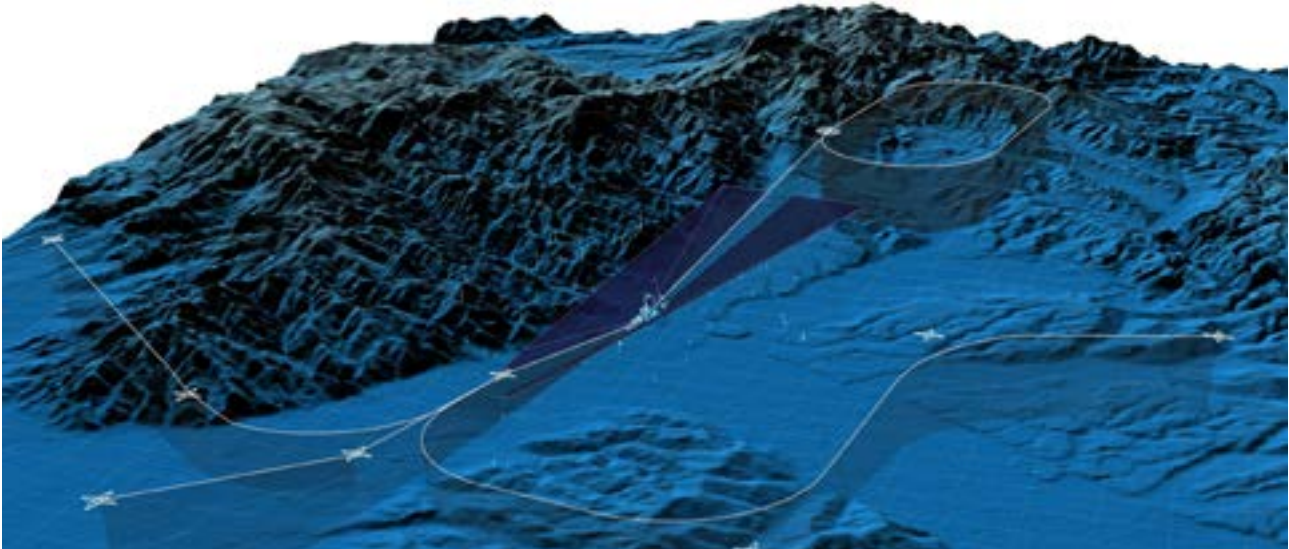
Nevertheless, while this practice is very common in many countries, it is well-known that there is a lack of detailed regulations and guidance material for conducting aeronautical studies for assessments of objects penetrating the OLS of an aerodrome. General guidelines exist for conducting a more generic “safety assessment” – but these do not provide any details about assessing physical obstructions. This leads to a lot of confusion and conflict worldwide between project developers and aerodromes or aviation authorities, notably as aeronautical studies can get very complex if mitigating measures have to be implemented.

The Korea Transport Institute (KOTI), an innovative “think tank” supporting the local ministry of transport, identified this deficit in Korea and commissioned airsight to develop a proposition for the applicable aeronautical study requirements for assessing obstacles in Korea.

This assignment was embraced by airsight consultants with great enthusiasm. Within a few months, the airsight team considered numerous aspects in their analysis, including: the triggers of an aeronautical study and its process, the responsibility of the different stakeholders, the applicable requirements on entities conducting aeronautical studies and the elements that shall be contained in an aeronautical study – notably the impact and risk assessment methodology, the acceptable mitigating measures as well as the approval process. KOTI’s initiative will hopefully improve the relationship between aviation and non-aviation stakeholders in Korea, and serve as a model for other countries facing similar challenges.

Services: Aeronautical Study, Obstacle Assessment, Airport Safeguarding

# airsight projects



## ROMATSA - Romanian Air Traffic Services Administration

### Flight Procedure Design services for 12 Romanian Airports

airsight is providing since 2010 Flight Procedure Design services to ROMATSA, the Romanian Air Traffic Services Administration.

In April 2015 airsight has been selected by ROMATSA via a public tender process to provide Flight Procedure Design services at 12 Romanian airports and associated TMA.

In total, within a period of 18 months, over 130 procedures will be designed in accordance with ICAO PANS-OPS and PBN Manual.

airsight is authorised or recognised / endorsed by several States as an Instrument Procedure Design Organisation for both conventional and Performance-based Navigation (PBN) procedures, fulfilling the guidelines of ICAO Document 9906 Volume I - Flight Procedure Design Quality Assurance System and being ISO 9001:2001 certified. airsight has the personnel, equipment and expertise to conduct very efficiently large scale airspace development and Flight Procedure Design projects taking into account several complex interdisciplinary constraints (such as safety, noise and capacity).

Services: Flight Procedure Design, Air Traffic Management

#### Flight Procedure Design training course

airsight also provides courses on flight procedure design and obstacle assessment: please visit our website for information about the next sessions.

[www.airsight.de/training](http://www.airsight.de/training)

## Geneva Airport

### Safety Assessment of the new East Wing terminal and apron reorganisation

To match future demand, Geneva Airport planned the construction of a new 350 Million Euros Terminal. The building, known as the „East Wing“, will be about 520 metres long, 20 metres wide and 19 metres high, and will replace the existing facilities and strengthen long-haul services (6 Code F aircraft positions).

This project involved a major re-organisation of the apron assets (aircraft stands, taxiways, service roads, hydrant fuelling system), notably to accommodate the different phases of the terminal construction while minimising the impact on airport operations.

airsight has been commissioned by Geneva Airport to conduct several safety assessments for the construction phases and the final state of the East Wing. For this purpose, several workshops were organised and conducted to identify hazards, review risks (in terms of probability and severity), and develop mitigating measures.

Through a multidisciplinary iterative approach and the involvement of all relevant stakeholders (airline operators, ground handlers, apron management services, architects and civil engineers), not only the safety of the retained design was improved, but also airport operations and the phasing of the construction process.

All results of the project were documented by airsight and submitted to the responsible authorities, which approved the proposed construction in 2014.

Services: Safety Assessment, Apron Planning

# airsight projects

## Dubai Airports and Dubai Air Navigation Services (DANS) Safety Case for parallel runway operations under low visibility conditions

airsight has a long standing cooperation with Dubai Airports and Dubai Air Navigation Services (DANS), through engaging in numerous projects throughout the years. Under this project, airsight developed a safety case for the simultaneous operation of both runways at Dubai International (DXB) under Low Visibility Conditions (LVC) as part of the approval by the competent authority.

Dubai International has two parallel runways whereas only the northern runway was approved for take-off and landings during LVC. Even though such situation rarely occurs, this implies a significant capacity bottleneck which had to be challenged.

Limited visibility and reduced visual perception abilities of all stakeholders at the airport requires the implementation of specific provisions related to the infrastructure as well as to procedures. Therefore, airsight conducted an initial gap-analysis of the existing infrastructure and procedures against applicable ICAO Standards and Recommendations. As a result of this analysis, it could be demonstrated that the physical characteristics of the southern runway and adjacent areas meet these requirements.

A second study included a safety assessment of the ATC and airport operations procedures. The scope of this assessment was to identify possible hazards and risks associated with the implementation of the revised procedures, and to derive appropriate mitigation measures in cooperation with the process owners.

During LVC, special attention has to be given to the protection/safeguarding of aircraft taking-off or landing. Therefore, taxi procedures have been optimised for both traffic crossing the runway and traffic adjacent to the runway to warrant safe and efficient operations. Airsight contributed in the optimisation of the procedures based on its wide ranging expertise in airport operations and safety assessments. On the basis of the developed safety case, DANS & Dubai International Airport has been approved by the authorities for the simultaneous operations of both runways during LVC.

Services: Safety Assessment, Air-Traffic-Management





# airsight projects



## Auckland International Airport Runway construction works with displaced thresholds

airsight supported Auckland Airport in developing a safety case on displaced threshold operations.

As publicly announced in May 2020, Auckland Airport's sole existing runway will be shortened by 1.1km during the 8 to 10-week construction period, to enable some major slabs replacement in the touch-down zone area.

For this impressive 26 million NZD project, Auckland Airport collaborated with airsight in developing the safety case, along with strong involvement with all stakeholder groups (the local ANSP, airlines, pilot associations and federations).

To avoid a full closure of the runway, the selected method for this project was to temporarily displace the runway threshold. Such a project involves detailed preparation, to ensure that all infrastructural and operational elements have been carefully considered while not infringing safety. Thanks to some early preparation and some specificities of Auckland Airport, such as the availability of "Work-In-Progress" (WIP) infrastructural elements (secondary PAPI

and wing-bar lights) as well as procedures, the project could be implemented earlier than initially planned – using low traffic period during the COVID-19 outbreak.

As commonly accepted in the industry, the key to the success of such project is a close collaboration with stakeholders, to iteratively identify and evaluate available options and finally, commonly agree on the best solution. In this process, the development of a safety case plays a major role: it facilitates open-communication with stakeholders, structures the discussion around well-known principles, and while minimising risks is the top-priority, enables the consideration of numerous other aspects, such as feasibility and costs, environment and social responsibility, etc.

Services: Safety Assessment, Airport Operations in Conjunction with Construction Works



## Airport in Germany Data input acquisition and aircraft noise calculation for planning approval process

Since 2008, airsight has carried out aircraft noise calculations as well as the creation of data acquisition systems in accordance with the German Aircraft Noise Act as part of planning approval processes for a major german airport. According to the German Aviation Act, a planning approval procedure must be carried out for major infrastructure changes at airports (e.g. apron extensions). Within the planning approval process, the effects of these infrastructure changes on aircraft noise exposure in the vicinity of the airport must be discussed. Data collection and aircraft noise calculations are carried out in accordance with the German Aircraft Noise Act.

With reference to the Environmental Noise Directive 2002/49/EC, airsight supports airports and aviation authorities in noise mapping of aircraft noise (according to CNOSSOS-EU using ECAC Doc 29 methodology) as well as noise action planning.

Services: Noise Assessments, Sustainable Aviation



# airsight projects



## Tallinn Airport EASA Compliance review of airside planning

Lennart Meri Tallinn Airport (EETN) is the main airport in Estonia. It features a single 45 m wide runway with a length of 3070 m. In the next years the project “Tallinn Airport Airside Area Development Project” will aim to improve and expand the airside infrastructure. It will include for instance an extension of the existing runway and taxiways, the construction of new apron and taxiways, as well as a general upgrade of the infrastructure for CAT II operations (e.g. ILS, lighting systems etc.).

Estonia, as a member state of the European Union, falls under the scope of EASA. Therefore Tallinn Airport (EETN) has to comply with regulation 139/2014 (EU aerodrome regulations) and corresponding applicable specification for aerodrome planning and design (i.e. Certification Specifications).

The proposed design for the airport expansion project, developed prior the introduction of EASA specifications, was based on ICAO Annex 14 5th edition. Though ICAO and EASA requirements are very similar in scope and nature, the future airport infrastructure should be compliant to the new EASA requirements – and ideally consider the latest version of the 6th edition of ICAO Annex 14.

In this regard, airsight was commissioned to review the applicable differences between ICAO and EASA requirements and make recommendations on managing compliance.

airsight developed and uses comprehensive check-lists based on EASA specifications and their corresponding elements in ICAO SARPs and related guidance material. This makes such assessment very efficient and the provided results of the analysis enables a seamless conversion into the new EASA regulatory system, and warrant the viability of the future aerodrome layout.

Services: Aviation Regulations, Compliance Assessment

# airsight projects



## German Ministry of Transport

### Developing a concept for the implementation of safe flight operations under IFR conditions in uncontrolled airspace (class G)

The German Ministry of Transport commissioned airsight to develop a concept for implementation of flight operations under instrument flight rules (IFR) in uncontrolled class G airspace in Germany.

Unlike other European states, German airspace rules currently differ from the European Commission's Standardised European Rules of the Air (SERA) regulations as they do not allow flight operations under instrument flight rules (IFR) in uncontrolled airspace (class G). This is due to safety concerns caused by VFR flights operating above and below clouds, thus resulting in a potential risk of aircraft collision.

Allowing IFR flights to operate safely in class G airspace is essential to comply with European Regulation 923/2012 on air and operational provisions regarding services and procedures in air navigation and to respond to the growing demand for helicopter emergency medical services (HEMS) as well as supply services for offshore wind farms.

airsight has detailed knowledge of national and international regulations and a dedicated and highly qualified team of experts with extensive references on safety assessments and flight procedures, and managing stakeholders with diverging interests (i.e. National Aviation

Authorities, military, airspace users).

The study included an assessment of the legal framework, the establishment of a comprehensive airspace concept, the development of processes for the approval of flight operations as well as the drafting of regulatory requirements to implement future procedures.

The end objective of this project was to determine the conditions acceptable to achieve a high level of safety for all stakeholders involved, and to facilitate the acceptance and future implementation of such a concept.

Services: Flight Procedure Design, Air Traffic Management, Aviation Regulations

# airsight projects



## Anjouan Ouani Airport, Comoros Design of a new RNAV approach procedure

The use of area navigation (RNAV), based on the Global Navigation Satellite Systems (GNSS), brings several benefits to access remote airports not equipped with traditional ground based radio navigational guidance: it increases safety by providing precise guidance for pilots and therefore makes the approach easier to fly and reduces chances of controlled flight into terrain. RNAV approaches can further enhance the availability of the airport as well as flight efficiency.

Air Austral is a French commercial airline with headquarters and main-base in La Réunion. It operates scheduled services to Europe, Africa, Thailand as well as to a number of destinations in the Indian Ocean, including the island Ajouan of the Comoros.

On behalf of Air Austral, airsight designed a new RNAV instrument approach procedures to Ajouan's Ouani Airport in accordance with ICAO PANS-OPS, ICAO PBN Manual and the guidelines of ICAO Document 9906 Volume I - Flight Procedure Design Quality Assurance System.

This project introduced Instrument Flight Rules (IFR) procedures for Air Austral to Anjouan Ouani Airport.

Services: Flight Procedure Design, GNSS Approaches



## Malta International Airport Aeronautical Study on the installation of a solar farm

Solar panels are becoming increasingly attractive as a means of supporting the energy requirements of airports. They allow airports to reduce their operating costs and reinforce their commitment to the environment.

Nevertheless, the installation of solar panels may be limited by aerodrome safeguarding constraints and, as required by ICAO, further require an Aeronautical Study to ensure that safety of operations will not be compromised. In this context, airsight was commissioned by Malta International Airport to conduct an Aeronautical Study in order to determine the possible locations for the installation of a large-scale solar farm within the perimeter of the aerodrome using a safety-based approach.

The developed Aeronautical Study consisted of a review of the applicable regulations and guidance material available and the identification of potential hazards, e.g. sun reflections and glare on ATCOs and pilots, potentially

impaired rescue and firefighting operations, interferences with navigation (e.g. ILS) and surveillance equipment (radars). Based on the identified hazards and associated risks levels, mitigating measures were identified and possible locations for the installation determined.

Airports present a significant opportunity for hosting solar technologies due to large amounts of open land, however the successful implementation of solar systems depends on detailed planning and safety analysis as performed in this project.

Services: Aeronautical Studies and Safety Assessment, Obstacle Assessment, CNS Site Analysis

# airsight projects



## Brussels Airport Aircraft Stands Optimisation

Most incidents occur on the aircraft stands: on average, one incident resulting in aircraft damage occurs per 5000 flights. One of the main contributing factors for such high incident rate is the lack of space on stands, notably in the front of the aircraft. While most design are compliant with ICAO Annex 14 and EASA provisions, an optimisation of the aircraft stands layout can lead to a significant improvement of ramp safety.

The redesign of aircraft stands is a long and complex exercise. Therefore, Brussels Airport asked for the support of airsight for reorganising and optimising their aircraft stands.

airsight has years of practical knowledge in CAD-based simulations for apron design and aircraft stand optimisation tasks and is well aware – through numerous projects – of the best-practices increasing apron safety.

aircraft stand optimisation has several objectives, such as maximising the usable area in front of the stands for ground handling activities, as well as to minimise the number of stop lines to make it more workable for marshalls. The main complexity of this planning task resides in the consideration of each stand specific mix together with a high number of constraints, as ICAO/EASA separation

limits, airport specific guidelines for stand design and predefined operational processes, passenger boarding bridges operational limits (PBB), location of hydrant pits, escape corridors for fuel trucks etc.

Simtra's Pathplanner, used by Brussels Airport as well as airsight in most airport planning assignments, enabled the detailed modelling and simulation of the proposed objective and constraints, along with the identification of optimal stand layout.

Airport operators are partially responsible for safe operations during ground handling, and an efficient apron design is crucial to minimize the risks to both aircraft and personnel.

Services: Aircraft stands design, apron planning



# airsight projects

## Luxembourg Airport Feasibility Study Central De-icing Concept

airsight has been commissioned as a subcontractor to carry out a detailed assessment determining the suitability of new central de-icing concept at the existing airport site of Luxembourg Airport.

In general, de-icing processes at aerodromes are performed on stands or at dedicated centralised de-icing facilities. The implementation of a centralised de-icing concept represents a large investment, however it brings numerous advantages: i.e. the de-icing process takes place in closer vicinity to the runway (less critical hold over times – “HOT”), freeing up valuable capacity at the aerodrome as well as enabling a more efficient collection and recycling of fluids.

airsight specialises in airport operational and infrastructural planning, including de-icing facilities and processes. Notably, airsight developed a comprehensive study on the regulation of ground de-icing and anti-icing services at European aerodromes on behalf of European Aviation Safety Agency (EASA).

For Luxembourg Airport, the proposed concept was developed in line with relevant international standards by ICAO and EASA as well as industry best-practice guidelines.

The required number and area of de-icing facilities was based on an airport's specific traffic profile. Particular challenges of this project were the high traffic density during departure peak and the large proportion of large cargo aircraft placing a high demand on the efficiency of the processes. airsight assessed the general feasibility and potential benefits of implementing a centralised concept and carried out an optioneering study on various location options to derive the most suitable solution based on all airport specific characteristics and constraints.

Luxembourg airport is looking at extensive infrastructural enhancements. The results of this study facilitated the decision process for such a costly investment and allowed the airport to integrate appropriate implementation measures into the planning process.

Services: Feasibility Study, Winter Operations, Aircraft Deicing



# airsight projects

## Luxembourg Airport Planning and Design for Cargo Apron Extension

Besides its role as state's largest international airport with the highest passenger volume Luxembourg Airport is a major cargo-hub, by terms of freight tonnage one of the largest in Europe. It has an ideal location in the centre of Europe, connecting all 6 continents on a daily-basis.

To provide more capacity for air cargo traffic, the aerodrome operator Lux -Airport started in 2016 to extend its apron "P7" to the west and thereby add additional aircraft stands, usable for large cargo aircraft, e. g. B747-8F or AN124.

For this project, Lux-Airport commissioned airsight as main airport planner to review, validate and optimise the initial apron design as well as connected taxilanes, taxiways and service roads. Furthermore, airsight supported the responsible civil works authority and the safety management unit of Lux-airport with a detailed review of the construction works planning to maintain and optimize the safeguarding of airport and aircraft operations during the planned two years construction period.

For such projects, airsight uses several CAD-based software, such as AutoCAD® and Aviplan® as well as other utilities. These first serve to verify compliance with applicable ICAO and EASA requirements, notably by conducting simulations of aircraft and vehicle movements. Second these tools enable to plan and validate for all stands and aircraft types the positioning of critical elements such as markings, fuel pits and 400 Hz unit, jet blast fences, ground service equipment storage areas, etc.

Services: Airport Planning, Airport Operations



## airsight assists aerodromes with the new EASA aerodrome regulations

EASA aerodrome regulations are now in force, and concerned aerodromes have to „convert“ existing certificates into certificates that comply with the new regulations. airsight proposes new services to support aerodromes to face this challenge.

After several years of preparation and review, the new European regulations for aerodromes are now in force. Aerodromes will have until end of 2017 to comply with these rules and obtain from their responsible authorities a new certificate.

This conversion process may represent tremendous efforts for aerodromes: it requires the involved personnel to read and understand the new rules (more than thousands requirements spread in different books), demonstrate compliance across the entire organisation (provided material evidence is available), and to adapt operations to meet new EASA requirements. airsight, currently proposing the most complete training programme on EASA aerodrome regulations ([www.airsight.de/training](http://www.airsight.de/training)), now also offers consulting services to assist aerodrome facing this new challenge. The services proposed cover the entire life-cycle of a possible certification procedure, and can be customised to match each aerodrome specific requirement.

Services: Gap Analysis (CS, OPS), Development of Certification Basis (CB), Training, Management of deviations

**Contact airsight for more information on these services!**

# airsight projects

## Dubai Airports

### Designated Final Approach and Take-Off Areas (FATO) for helicopter operations

airsight has a long standing cooperation with Dubai Airports, being engaged in numerous projects, and has now been appointed to develop designated Final Approach and Take-Off Areas (FATO) for helicopter operations at Dubai International Airport (DXB) and Al Maktoum International Airport (DWC).

Dubai airports are currently not equipped with dedicated facilities for helicopter operations. The new facilities will cater the largest helicopters serving the Dubai airports for day and night operations.

To ensure safe helicopter operations on a surface level heliport, obstacle limitation surfaces need to be established taking into account critical objects, and approach and take-off climb criteria need to be defined carefully. airsight's wide ranging expertise and experience in the design of airport and heliport infrastructure includes various international projects dealing with numerous planning questions and all safety related matters.

The design is based on international standards and industry best practise and integrates the facilities into the existing airport infrastructure and operational conditions. The supporting safety cases assess potential hazards and inherent risks associated with the implementation of the facilities and identify mitigation measures ensuring safety of airport operations.

Services: Flight Procedure Design, Helicopter Operations



## Bodensee Airport Friedrichshafen

### Feasibility Study on New Tower Solution

The Bodensee-Airport Friedrichshafen has launched a feasibility study for the replacement of the aging airport tower and thus initiated specific steps for the planning and implementation of a new tower solution.

airsight has been commissioned to investigate various concepts for a cost-efficient, forward-looking and sustainable solution by the beginning of 2023 and to prepare a subsequent tender process. The focus is also on a so-called remote tower, in which the window view for the controllers is replaced by a sophisticated camera system. The possibility of creating a remote tower centre in Friedrichshafen, from which other airports could also be controlled as well, is also being investigated.

A similar project is already in the implementation phase in Braunschweig. In the future, the airports of Braunschweig-Wolfsburg and Emden are to be controlled from the remote tower centre being established there. airsight has also been supporting these two airports there for two years in the preparation and implementation of the project. Bodensee-Airport is the southernmost commercial airport in Germany and is located at Lake Constance not far from Austria, Switzerland and Liechtenstein in Baden-Württemberg.

Services: Aerodrome Safety, Feasibility Study

# airsight projects



## Cologne Bonn Airport

### Operational safety study: vehicle operations on a taxiway

Cologne Bonn Airport commissioned airsight to carry out a comprehensive exercise to develop an operational solution to allow safe operations of ground vehicles on the maneuvering area (i.e. live taxiway).

Ground service vehicles crossing an operational taxiway can be hazardous and can cause aircraft and vehicle delays as well as severe operational constraints. At Cologne Bonn Airport an essential service road connecting two main parts of the airfield crosses one of the operational taxiways – TWY B. To ensure safe and efficient operations of ground vehicles and aircraft taxiing, a suitable operational solution needed to be developed to improve the current situation. Aviation safety is one of airsight's core competencies, with expertise ranging from operational analyses to aeronautical studies and assessments on all kinds of safety matters that concern airport operators or air navigation service providers.

One particular challenge of this project became apparent when a benchmarking exercise showed that the layout

and operational necessities in CGN are unique in Europe and no similar processes exist at other airports that fulfil the specific requirements of this particular situation. To account for the distinctive nature of the task, specific safety requirements were defined, serving later as key indicators for the realisation of an operational concept. Various options were developed and evaluated including operational regulations aided by gates or barrier mechanisms, re-routing of taxiflows and a complete re-design of the intersection. During the optioneering process comprehensive stakeholder consultations were carried out to reach consensus and agree a serviceable solution. This study derived a solution that provides operational safety and is commercially viable, provided vital aid for the consultation process and achieved the necessary stakeholder consensus.

Services: Safety Assessment, Airport Operations



## Regional airport

### Runway layout optimisation

Regional airports are of crucial importance, particularly on remote islands with few connections to the mainland. Their development is significant for both, tourism and local residents. However, the extension of their infrastructure is often limited by the surrounding environment – and ever demanding regulatory requirements.

airsight provided its expertise to optimise the proposed extension of a new runway, taking into account the very demanding requirements in terms of runway field length (to reach long range destinations) on the one hand as well as the numerous constraints such as the obstacle situation, flyability, land use and the new EASA regulations for aerodrome certification on the other hand. In such a difficult environment – infrastructural, operational and regulatory – a holistic approach is essential which makes airsight's competencies in these subject matters a great benefit for airport project developers.

Services: Runway Design, Flight Procedure Design, Obstacle Assessment



# airsight projects



## Dubai International Airport Safety Case for construction works within the runway strip

In summer 2013, airsight was commissioned to develop a safety case for construction works within the runway strip at Dubai International Airport (DXB). The project was conducted in close cooperation with different departments of Dubai Airports (Development, Compliance and Airside Operations), DANS (Dubai Air Navigation Services) and the construction companies.

Prior and after a temporary closure of runway 12R/30L in 2014, various constructions are required to be conducted within the strip during flight operations on the runway. In order to ensure the safety of operations on the runway as well as on the adjacent taxiways and the construction site, a comprehensive safety case was created. The aim of this safety case is the identification of potential hazards, the assessment of inherent risks and the development of adequate mitigation measures.

In a first step, the system to be assessed was defined and the potential hazards were identified within a workshop. Based on the results of the hazard identification, all risks were assessed in terms of frequencies and severities.

Within this process, various methods (qualitative and quantitative) have been applied. As an example, for estimating of the probability of a collision of an aircraft veering-off the runway with the construction site, airsight's veer-off risk-model was applied. The evaluation of the risks induced by other processes of operational nature, such as the accessibility of the construction site, could be assessed qualitatively within dedicated expert workshops.

Later, during a final workshop, the risks have been reviewed and the derived mitigation measures have been discussed in terms of feasibility and effectiveness. To conclude the project, all results of the safety case were documented in accordance to the template used by Dubai Airport Airside Operations Department.

Services: Safety Case, airport operations in conjunction with construction works

# airsight projects

## Copenhagen Airport Aeronautical Study to Assess the Operation of Airbus A380

Aircraft whose code letter is higher than the code letter of the respective aerodrome reference code generally have an impact on given aerodrome facilities, services, and operations when the dimensions and/or mass of these aeroplanes exceed the design parameters used in planning and developing the aerodrome. As per Commission Regulation (EU) No 139/2014, airport operators should carry out an appropriate safety assessment to evaluate the need for mitigation measures, operational procedures and operating restrictions for the specific aeroplane concerned to ensure safe operations.

Copenhagen Airport (CPH) is certified for aerodrome reference code 4E operations. airsight has been appointed by its airport operator Københavns Lufthavne A/S to conduct a comprehensive aeronautical study addressing the impact of Airbus A380 aircraft operations.

To satisfy European regulations the study addressed all infrastructure elements relevant for A380 operations, i.e. runway incl. adjacent areas, obstacle limitation and operation of PAPI, taxiways and taxilanes as well as aircraft stands and de-icing pads. Further consideration was given to the strength of pavements, potential jet blast effects and the impact on CNS equipment as well as rescue and firefighting, and procedures for removal of disabled aircraft.

Eventually, identified deviations have been assessed. Where deemed necessary, mitigation measures have been proposed including the application or adjustment of airfield ground markings and the implementation of operational procedures to ensure safe operation of A380 aircraft.

Services: Airport Planning, Aeronautical Study  
Services: Operational Reviews



## Airport Berlin Brandenburg Safety Assessment of non ICAO-compliant independent parallel departures

airsight and its external partners were (in the context of an EU wide tender procedure) commissioned to conduct a Safety Assessment for non ICAO-compliant independent parallel departures at Berlin-Brandenburg Airport (BER) taking into account Implementing Regulation (EU) No. 1035/2011 (Requirements for the provision of air navigation services).

According to ICAO, independent IFR departures may be conducted from parallel runways, provided the departure tracks diverge by at least 15 degrees immediately after take-off. This design criteria, initially defined to enhance safety of air operations by increasing the spatial separation between departing aircraft, is however a major constraint for developing more efficient and environmentally sustainable flight routes.

Therefore, based on the currently ICAO-compliant routes developed by the German Air Traffic Services (DFS) for BER on its opening, airsight is responsible to evaluate whether – and under which conditions – non ICAO-compliant alternatives may ensure the same Level of Safety.

This Safety Assessment will be aligned to Eurocontrol Safety Assessment Methodology (SAM) as well as above mentioned EU regulation and consider aspects of airspace design, Air Traffic Control, as well as the technologies and equipment available.

In this exercise, airsight combines its expertise in the fields of Safety Assessment, Flight Procedure Design, Airport Operations and Environmental Impact Assessment to develop and assess possible alternative scenarios.

Services: Safety Assessment, Air Traffic Management, Flight Procedure Design

# airsight projects

## Hamburg Airport

### Apron rehabilitation and flight operations

Hamburg airport is planning within the infrastructure programme “HAM NEXT” to rehabilitate and optimise its main apron (around 250 000 sq. m) as well as certain taxiways. The main challenge of this project is to conduct major civil works in conjunction with airport operations.

Following a Europe-wide official public procurement procedure, Hamburg Airport selected airsight as planner and technical consultant, in order to ensure safe and efficient operations while rehabilitating its main apron.

airsight is responsible for optimizing both the construction phases and the interim apron layouts, as well as to coordinate with the different airport departments and other stakeholders the upcoming civil works and resulting operational constraints. To preserve a maximum of positions opened, as well as to maintain safe operations at all time (e.g. low visibility operations), a systematic approach has been applied. This approach is based on a detailed analysis of the operational processes (e.g. ground handling, aircraft and vehicles movements) and interrelations between the different airport components, equipment and system requirements.

Within this project, airsight develops the project documentation required by the responsible authorities and defines the technical specifications related to apron operations to be followed by the civil engineering companies responsible for the realisation of the project.

Services: Aerodrome operations in conjunction with construction works

## Malta International Airport

### Obstacle and operational Safety Assessment of a new hangar

Safe airport operations demand a permanent monitoring of obstacles in the close proximity of airports as well as beneath the respective obstacle limitation surfaces. The construction of new infrastructures requires a systematic obstacle evaluation to ensure that the necessary level of safety is maintained.

Malta International Airport commissioned airsight to analyse the impact on safety of a new hangar (ICAO Annex 14 and PANS OPS), representing a potential infringement of the applicable ICAO obstacle limitation surfaces. Besides the new building itself, airsight also evaluated other obstacles, such as the hangar construction site (including cranes), existing buildings or mobile objects (taxiing or parking aircraft) for all runways and operations.

The most important outcome of the study is that the hangar could be erected, and the additional results of the safety assessment served as a basis to determine the most efficient mitigating measures balancing both safety and operational constraints.

Services: Obstacle Assessment, Aeronautical Study



# airsight projects

## Solar Farms at Airports - A key to the Transition to Renewable Energy at Aerodromes

In view of recent developments on the global energy markets, rising electricity and energy prices on the one hand, and efforts to reduce the airport carbon footprint on the other, many airport operators are seeking for a safe and independent energy supply powered by renewable energies. Airports often have large areas of undeveloped land or flat building roofs that could, in principle, be used for solar energy. While waiting for further sustainable operational improvements, as well as worldwide introduction of sustainable aviation fuels (SAF) or alternative propulsion technologies for aircrafts, solar energy, in contrast, represents a ready-to-use technology with a positive impact on the airport carbon footprint.

The solar power yield at airports can be massively increased if unconstructed spaces near aircraft movement areas are used. However, placing a solar farm (e.g., with PV arrays) near aircraft movement areas is challenging from a safety and compliance perspective. Airport operators might ask questions such as:

What about glint & glare from solar panels for pilots and ATC?

Do the PV arrays pose an obstacle to aviation and is there a possibility of interference with CNS equipment?

Are the necessary safety distances ensured on the ground? (e.g. to runway or taxiway strips)

airsight performs feasibility studies for solar power plants near aircraft movement areas. Doing so, we support airports to reduce their carbon footprint, improve sustainability of the airport's operation and being independent from fossil-based energy sources. Our aim is to maximize the output of the proposed solar power system at the airport, while maintaining high safety levels at airports. For hazards posed by solar arrays near aircraft movement areas, a multi-level risk assessment is mandatory to ensure that only acceptable risks exist for airport operations.



### Our services and deliverables at a glance:

- Hazard analysis and risk assessment of glint and glare from solar farms
- Photovoltaic (PV)-panels (ground/roof installation, based on azimuth/tilt angles of PV-panels, panel material, fixed vs. single/dual tracking)
- Concentrated solar power (CSP), if located in the (greater) vicinity of an airport
- Optimization of PV siting and configuration close or within an airport: Identification of the optimum PV panel configuration with minimum glare while maximizing system output
- Development of mitigation measures to limit glint & glare effects
- e.g. single/dual tracking, anti-reflection coating (ARC)
- Obstacle assessment
- CNS assessment
- Impact Assessments of PVS on operational services, i.e. Rescue and Firefighting Services (RFFS)
- Plume vertical velocity assessment (only CSP related)
- Compliance checks (acc. EASA CS-ADR-DSN/CS-HPT-DSN) for siting of PV panels near aircraft movement areas
- Grid connection planning PV-panel -> substation (if within airport boundaries)
- Estimate solar panel output based on feasibility study
- Provide input for CO<sub>2</sub> mapping (ISO14001, Airport Carbon Accreditation)
- Environmental Impact Assessment (EIA) on biodiversity
- Impact assessment on Wildlife Strike Hazard Management

For the evaluation and risk assessment of solar power plants at airports, we draw on our broad expertise in the field of hazard analysis and risk assessment with a cross-disciplinary team of experts in sustainable aviation, airport planning and compliance, experts for aerodrome safety and assessments of solar glint & glare, obstacles, and CNS-equipment.



# airsight projects



## **Warsaw Chopin Airport** Study on the implementation of ILS CAT III Low Visibility Procedures

Following a European wide public procurement procedure, Warsaw airport commissioned airsight and its partners ARUP and Airbus to assess the feasibility of implementing ICAO CAT III precision approach and landing operations as well as take-off operations under low visibility conditions (LVTO).

The extensive study was divided into several work-packages. The main aims were to investigate the cost/benefit of achieving lower decision heights and to assess all main technical and operational aspects related to a CAT III operations upgrade.

After conducting a comprehensive compliance study of the airport infrastructure against ICAO requirements (incl. analysis of the obstacle situation), airsight carried out a safety assessment, as required by the regulations for such major changes of operations. Infrastructural and operational changes required to accommodate CAT III operations were documented and prioritized to facilitate their implementation and to obtain approval from the appropriate authorities. airsight further reviewed the current training of the operations and airside personnel and undertook an analysis of the potential cost and benefit of a future implementation of a GNSS Landing System (GLS).

In addition, a specific site study was conducted using analytical simulation to determine the required dimensions of the ILS critical and sensitive areas for CAT III operations, taking into account possible interferences caused by objects near the runway such as other aircraft, buildings and objects.

Services: Compliance Assessment, CNS Site Analysis, Low Cost-Benefit Analysis

## **Aéroports du Cameroun** Aerodrome Certification in Cameroon

In cooperation with the Flughafen München GmbH – inter alia responsible for the project management –, extensive compliance analysis of the airside infrastructure, procedures and equipment were conducted at the airports Douala (DLA) and Yaoundé Nsimalen (NSI).

After an in-depth off-site assessment (e.g. based on obstacle data, CAD plans, certificates and other data available), a two weeks on-site inspection campaign was conducted by airsight, amongst others to measure or collect information not yet available.

To manage such large and complex aerodrome infrastructure and operations compliance inspections against national or international regulations, airsight developed a unique methodology supported by associated tools and databases (e.g. compliance check-lists, software for the automatic evaluation of possible obstacle infringements, geo-referenced pictorial documentation of findings). These enable to conduct thorough and systematic compliance verifications to various ICAO SARPs or other specifications (guidance material or national specifications), as well as to document efficiently possible findings.

Services: Certification Support, Compliance Assessment



# airsight projects



## Berlin Tegel Airport

### Aeronautical Study of ICAO Code E Aircraft Operations

The number of ICAO Code E aircraft (A330, A340, B777, B747) operating at Berlin Tegel airport has increased and this process will continue until the airport closure. To ensure that operational safety for these aircraft types is not compromised, the airport operator contracted airsight to conduct an aeronautical study of the airside areas at risk. The study included the detailed analysis of the relevant infrastructure, such as the width of taxiways (main gear clearance), the clearances between taxiing and parking aircraft and objects (wing tip clearance), as well as the runway and taxiway shoulders and strips.

Services: Aeronautical Study, Compliance Assessment

## Berlin Brandenburg Airport

### Conduction of training courses within the ORAT program for BER airport future airside personnel

The airport operator is facing a series of important challenges due to the imminent launch of the new international airport Berlin Brandenburg (BER). This includes, among other things, the merger of the approximately 17,000 employees of the company as well as external service providers from the previous two Berlin airports Tegel and Schoenefeld on the capital's new airport. To ensure a smooth start, a series of preparatory measures are being taken within the project ORAT (Operational Readiness and Transfer). Besides testing the new equipment and operational procedures, preparatory training courses for the employees of the airport operator have been scheduled.

airsight was responsible for the training of the approximately 5 000 persons on the following specific topics: Apron training (topography, infrastructure, operations), training on processes in the Airport Operations Control Center, Winter service training, Radio training, training on practices in the area of runways and taxiways (driving licence training), as well as training for the logistics companies involved in the airport transfert.

The team of airsight was composed of 15 instructors, with an extensive experience in the development and conduction of training courses related to airport operations.

Services: ORAT Training, airside driver training





# airsight projects

## ROMATSA

Flight Procedure Design, coding and flight inspection of P-RNAV and conventional SID-STAR routes in Romania

airsight has been awarded a series of contracts for the design, encoding, charting and validation of conventional and P-RNAV Flight Procedures in Romania.

The contracts aimed to develop Standard Arrival Routes (STARs) and Standard Instrument Departures (SIDs) within the Arad, Cluj, Timisoara, and Bucharest TMAs.

The routes were designed by airsight according to ICAO requirements (ICAO Doc. 8168 – PANS OPS, Doc. 9906 – Quality Assurance Manual for Flight Procedure Design, ICAO Doc. 9613 – Performance-Based Navigation Manual) and with the objectives of optimising the route structure for Air Traffic Control and airspace users in terms of safety, workload, capacity, fuel consumption and environmental consideration (such as aircraft noise).

Within this project, airsight also managed and supervised the coding, charting, and flight validation of the designed procedures. These inspections aimed to ensure the flyability and validity of the new procedures prior their final acceptance by the responsible civil aviation authorities.

Services: Flight Procedure Design, Coding and Charting

### About airsight flight procedure design services

airsight develops flight procedures taking into account several interdisciplinary constraints (such as safety, noise and capacity) as well as airspace configuration integration issues in coordination with ANSPs, aviation authorities, airports and airlines.

airsight flight procedure design department is certified ISO 9001, and developed in the last few years conventional and Performance Based Navigation (PBN) approaches for numerous clients worldwide.

In addition, airsight also proposes since the year 2000 obstacle assessment and flight procedure design training courses, which provides participants comprehensive insights into complex topics. For more information on airsight training, please visit:

[www.airsight.de/training](http://www.airsight.de/training)



# airsight projects



## Wind Energy Project Developers Aeronautical Study for Wind Turbines

The growth of wind energy leads to more and more turbines being constructed near aerodromes. With a height of 150 m or more wind turbines can represent a serious obstacle for aircraft. In addition, in the vicinity of smaller airports where flight operations are conducted under visual flight rules, wind plants may represent a serious hazard to airport operations. Turbines can further have adverse effects on radar signals (e.g. reflection, distortion) which affect the safety of flight operations. Therefore, when wind turbines are placed nearby airfields, it is necessary to consider all possible impacts on the safety of flight operations during planning and approval procedures.

airsight conducted in the last few years over 20 aeronautical studies related to the installation of wind turbines on behalf of project developers.

*International aviation regulations state that: „objects which extend to a height of 150 m or more above ground elevation shall be regarded as obstacles, unless an aeronautical study indicates that they do not constitute a hazard to aeroplanes.”*

### Wind Turbines and Aerodrome Operations

airsight and its partners assisted numerous project developers planning new wind farms or single wind turbines in considering all aeronautical related aspects and in obtaining required authorisations. In these projects, airsight defined the possible constructible areas, evaluated and mitigated the impact of wind turbines on air operations - while taking into account diverging external stakeholders' interests (aerodromes, aviation/military authorities, air navigation service providers).

### Wind Turbines and CNS Compatibility

Wind turbines may cause interferences on Communication Navigation Surveillance (CNS) equipment (radar, Instrument Landing System etc.) and consequently can affect the safety of air operations. Therefore, project developers must either comply with very restrictive requirements, or demonstrate that proposed developments do not interfere with CNS equipment. airsight conducted site specific assessments supported by numerical simulations to verify the availability or quality of CNS signals, and demonstrate to the authorities the feasibility of the proposed projects.



# airsight projects

## Cologne Bonn Airport EASA Nominated Persons Audit at Cologne Bonn Airport

In accordance with the requirements of Regulations (EU) 2018/1139 and (EU) 139/2014, aerodrome operators are obliged to establish and carry out an internal audit programme. The scope of the audit programme extends to the Implementing Rules, the associated Acceptable Means of Compliance and the Certification Specifications for the aerodrome infrastructure.

Cologne Bonn Airport commissioned airsight with the external and independent auditing of its organisation and operations in accordance with the above-mentioned EU/EASA aerodrome requirements. The focus was on the Nominated Persons and their respective departments affected by the requirements. The aim was to assess the degree of compliance of each organisational unit. Both, on site and video conference audits, were conducted. Audit preparation, implementation and follow-up were subjected to the requirements of DIN EN ISO 19011.

*Through the audits, we gained a very valuable independent view of our organisation, operations and the corresponding EASA compliance.*

- Nominated Person EASA Compliance/Change Management

The audits helped Cologne Bonn Airport to obtain an efficient and independent assessment of its actual compliance status with the EU/EASA requirements and to prepare for frequent oversight audits by their Competent Aviation Authority. Furthermore, the commissioned audits were part of the internal audit programme and thus themselves serve as evidence that compliance is also monitored proactively and independently of the authority audits.



In total, the following topics were audited by the airsight auditor team over a period of approx. 2 months:

- Safety Management
- EASA Compliance Management
- Training
- Maintenance
- Operations
- Central Data & Documentation Management

Due to the large number of audit topics, as well as the availability of the various specialist departments, close coordination with the aerodrome operator was necessary from the very beginning in order to be able to complete all audits according to the agreed schedule. The high level of commitment and participation of all Nominated Persons as well as other employees enabled an objective examination of the EU/EASA requirements and their implementation at Cologne Bonn Airport. All audits were completed within the planned project schedule.

The audit results were documented in audit reports for each department and forwarded to the Nominated Person for EASA Compliance/Change Management at Cologne Bonn Airport. Decided audit findings (Findings, Observations) were categorised accordingly and assigned to the applicable EU/EASA requirements (audit criteria). In a final meeting, the audit results were presented to the Accountable Manager, the Nominated Persons and the aerodrome management. Based on the results, specific corrective and improvement measures could be introduced.

Services: Airport Certification, Auditing

# airsight projects



## German Ministry of Transport

### Supporting research for the development and implementation of the German State Safety Programme

ICAO Annexes include the requirement for States to establish a State safety programme (SSP) aimed to achieve an acceptable level of safety in aviation operations.

A safety programme is an integrated set of regulations and activities aimed at improving safety (ICAO Doc 9859). The core objective of an SSP is the development of integrated safety management capabilities within the state's authorities and its stakeholders (aircraft operators, air navigation service providers, certified aerodrome operators, maintenance organisations...), in order to strengthen of both prescriptive and performance based oversight.

An SSP is based on the four main elements of Safety Management, namely State's Safety Policy and Objectives, Safety Risk Management, Safety Assurance, Safety Promotion.

Within this two-year project, airsight consultants will assess through interviews and workshops involving industry stakeholders the current implementation status of the SSP main elements, analyse possible gaps, and ultimately propose a concept for the development and implementation of Germany's future aviation safety programme.

Services: Aviation Regulations, State Safety Programme

### Apron Layout Optimisation and Aircraft Stand Redesign

Airport aprons, including aircraft stands, are often the most active and congested areas at an airport. Their design and configuration are critical to the safety and efficiency of aircraft servicing, fuelling, ground service equipment staging and storage and personnel activities, as well as passenger movements and cargo. Aprons may encompass even further facilities, including de-icing areas, maintenance areas, heliports, aircraft engine runup area, etc.

Every airport is facing a great challenge to keep their apron up-to-date with new aircraft fleet, technology and equipment, operational practices, but also in-line with regulations, best-practices and airlines requirements.

The regulations on apron planning and design have continuously been adapted by ICAO, EASA or other national regulators and airports can greatly benefit from these recent changes in the regulations. For instance, by implementing reduced taxiway and taxilane clearances as introduced in ICAO Annex 14, Volume 1, 7th Edition, airport operators may be able to gain additional area on stands, thus greatly enhancing turnaround efficiency and airfield capacity. Similarly, aircraft stand clearance can be obtained in accordance to the latest EASA Certification Specifications (for Code C) and further optimised with an Advanced Visual Guidance and Docking System.

Services: Airport Planning, Airport Certification

# airsight projects

## Luxembourg Findel Airport Code E and F Aircraft Aeronautical Study

The operation of New Larger Aeroplanes (NLAs), such as the 747-8F (considered with a wingspan of 68.5 m as Code F aircraft), poses a host of challenges for aerodrome operators, especially at aerodromes which infrastructure was not designed to fit aircraft of such dimensions.

Prior operating such new type of aeroplanes, aerodrome operators shall provide the responsible authorities with the appropriate documented evidence of compliance with the applicable regulations (ICAO Annex 14), and demonstrate that possible deviations does not adversely affect the safety or significantly affect the regularity of operations of aeroplanes at the aerodrome.

airsight was commissioned by the company “TR Engineering”, to conduct an aeronautical study on ICAO Code E and F aircraft operations at Luxembourg Findel Airport, in order to ensure the safe operations of Cargolux new fleet of 747-8F.

The conducted study included the compliance verification of runways (dimensions, shoulders, separations), straight and curved taxiways and taxilanes (dimensions, shoulders, separations), runway holding positions, visual aids, lighting and marking, aircraft stands, as well as rescue and fire fighting services. The utilisation in such project of a risk-based approach, supported by the work of the “Boeing 747-8 Airport Compatibility Group (BACG)” (published in 2008), enables to demonstrate that - taking possibly into account especially developed mitigation measures - some deviations may not infringe safety.

Services: Aeronautical Study, Compliance Assessment

## Safety Assessment for reduced Approach Lighting System

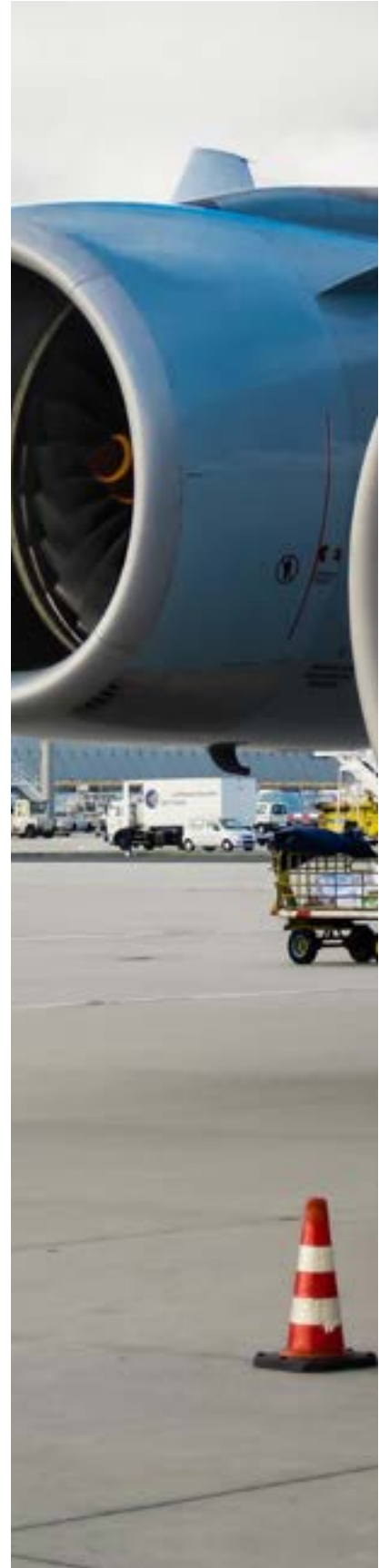
In some cases, the required length for an Approach Lighting System cannot be fully provided in accordance to ICAO or EASA requirements: due to topographical (lake, sea, mountain) or other reasons, only a reduced Approach Lighting System can be provided.

Such deviations may hinder airport operators to introduce precision approaches (e.g. ILS CAT I, ILS CAT II), or may require the introduction of operational restrictions. However, an Aeronautical Study or Safety Assessment may be used to determine if the safety of air operations is effectively compromised, and if the non-compliant Approach Lighting System can be tolerated.

A European airport operator was confronted with the above-detailed situation: the required 900m length for the Approach Lighting System could not be provided to the full extent for ILS CAT I and CAT II operations. It commissioned airsight to conduct a safety assessment aiming to evaluate the impact of the non-compliant installation on the safety of air operations.

airsight's assessment consisted first in a comprehensive review of the applicable requirements, contained in different documents, such as ICAO Annex 14 – Volume 1 and EASA.CS.ADR and associated Guidance Material (GM), but also in EASA “Commercial Air Transportation” (Part-CAT) and “Specific approvals” (Part-SPA).

Services: Safety Assessments, Aeronautical Study



# airsight projects



## European Aviation Safety Agency (EASA) Study on the regulation of ground de-icing and anti-icing services

The danger posed by thickener residues from certain types of anti-icing fluids has been known for some time. Incidents in past years have led to a number of safety recommendations made to EASA by several Accident Investigation Bodies.

airsight GmbH was commissioned by EASA to investigate and recommend the means by which Aviation Authorities of Member States manage matters with respect to the certification of service providers, and availability of fluids at aerodromes.

The Study, finalised in 2011, concludes by recommending that EASA develop a work programme aimed at making improvements in six distinct areas, built upon the Recommendations made in the Final Report. The Final Report contains 26 recommendations for action which are aimed at improving the safety of de-icing / anti-icing of aircraft during ground operations. The solutions recommended include voluntary and regulatory actions involving national authorities, air operators, aerodromes and service providers.

Services: Aviation Safety Regulations, Regulatory Impact Assessment

## Luxembourg Findel Airport Operational concept for rehabilitating the runway while continuing air operations

To minimise the impact of the construction works on air operations, runway rehabilitation projects are often divided up into phases, where different parts of the runway remain operational with a reduced length available.

airsight was tasked by "TR Engineering" to determine possible operational strategies to enable continuous safe air operations while rehabilitating the runway.

To enable a phasing of the reconstruction works, achieved by temporary displacements of the runway thresholds, airsight engineers determined the required take-off and landing distances taking into account aircraft performance as well as the existing movement areas.

Additionally, based on applicable regulations and industry practices, the consultants defined the applicable restrictions to be observed on the construction site (e.g. restrictions due to jet-blast, ICAO obstacle limitation surfaces, ICAO runway strips, low visibility procedures etc.), as well as the necessary steps for a detailed planning and scheduling of the reconstruction.

A thoroughly planned efficient runway rehabilitation operational concept minimises impacts on air traffic operations while maintaining defined safety levels. In turn, this reduces cost as well as construction time during the rehabilitation phases.

Services: Aerodrome operations in conjunction with construction works



# airsight projects

## **Kaunas / Vilnius International Airports** Feasibility study and development of Low Visibility Procedures (CAT II)

The introduction of ILS CAT II/III procedures is essential to many airlines, as it allows the operational availability of the airport in all weather conditions. However, several operational and technical factors need to be considered in order to ensure safe operations.

In 2010, airsight assisted Vilnius and Kaunas International Airports, the two largest Lithuanian aerodromes in upgrading to ILS CAT II operations and introducing Low Visibility Procedures. These projects started with an initial evaluation of the meteorological statistical data (e.g. Runway Visual Range, cloud ceiling, wind) to quantify the potential capacity increases. Subsequently, as required per ICAO, airsight conducted a compliance assessment of the aerodromes' infrastructure and equipment against the applicable Standards and Recommended Practices (SARPs) for CAT II operations. The result of this assessment was a work programme and recommendations that the aerodromes and responsible authorities could follow to ensure compliance and to facilitate the operational upgrade. Taking into account the obstacle situations, airsight also determined the applicable Obstacle Clearance Altitudes / Heights for the new ILS CAT II approaches.

Furthermore, airsight consultants also assisted Vilnius Airport in the development of tailored Low Visibility Procedures, taking into account several specific characteristics and local constraints.

Services: Low Visibility Procedure, Compliance Assessment, Obstacle Assessment



## **European Aviation Safety Agency (EASA)** State of Implementation of ICAO Regulations at Euro- pean Aerodromes

EASA is the centrepiece of the European Union's strategy for aviation safety and will in future be responsible for the legal implementation of ICAO Annex 14 within the EU.

Together with its partner TÜV NORD CERT, airsight was commissioned by EASA to collect and analyse information on the state of the implementation of the provisions of that ICAO Annex 14. This study involved the visit of 30 EASA Member State Civil Aviation Authorities and 56 aerodromes, aiming to better understand the different national regulatory approach towards aerodrome safety and identify best practices. The results shall further serve as a basis to assess the level of flexibility of the upcoming EASA Implementing Rules required to take into account the specific particularities of each Member States.

Services: Aviation Regulations, Compliance Assessment, Aerodrome Operations, Safety Management

# airsight projects



## Brussels Airport

### Impact of Cross- and Tail-Wind on Aerodrome Safety, Capacity and Noise

Cross- and tail-wind have a high impact on flight safety and aerodrome operations. Though international standards or best practices may be applied to define the maximum wind components, these are rarely supported by a thorough underlying rationale and do not take into account airports specific characteristics. airsight, on behalf of the Belgian State Secretary for Mobility, carried out in 2009 a qualitative and quantitative analysis on the combined impact of alternative maximum wind component figures on safety, capacity and noise pollution at Brussels International Airport.

Services: Safety Assessment, Capacity Calculation, Noise Simulations



## EUROCONTROL

### Cost of Safety Management System

The lack of resources allocated to Safety Management System (SMS) is a major concern for the successful implementation and operation of SMS.

This issue is partially due to the non-availability of reliable information to support the decision of allocating resources (manpower, equipment and money) to SMS. airsight developed in 2009 for EUROCONTROL a standard Cost Model aiming to quantify costs of SMS. It enables a detailed estimation of these costs, in order to assist Safety Departments and budget responsible persons to make informed decisions on the resources to allocate to SMS activities, as well as to better understand the composition of the cost of an SMS.

Services: Air Traffic Management, Safety Management, Economical Study

## Irish Aviation Authority

### Aeronautical Study & Safety Evaluation for the Planned New ATC Tower of Dublin International Airport

On behalf of the Irish Aviation Authority (IAA), airsight – together with Aviation Solutions – analysed the impact of a new 100m high control tower building with respect to safety and operational aspects. A special focus was set on the construction phase of the building (e.g. effect of cranes).

The safety analysis covered the compliance verification of the new tower according to different international aviation regulations (ICAO Annex 14 Obstacle Limitation Surfaces, ICAO PANS-OPS Surfaces) as well as a quantitative analysis of the risk of aircraft collision based on the ICAO Collision Risk Model. In addition, the analysis covered the various requirements by ICAO PANS-ATM and included analyses of the line-of-sight, the floor space and the controller working positions and the CNS / ATM Equipment.

Services: Obstacle and Safety Assessment, ATC simulations

# airsight projects

## Düsseldorf Airport

### External Audit – EU/EASA Compliance Monitoring System at Düsseldorf Airport

The Compliance Monitoring System of an aerodrome operator plays a vital role in ensuring and verifying regulatory compliance with the applicable requirements (i.e. EU/EASA requirements).

But who verifies that the Compliance Monitoring itself is properly following the requirements from the EU/EASA regulation, aerodrome manual and internal processes? Auditing the Compliance Monitoring itself is not a “nice to have”, it is a key mean of compliance to the Aerodrome Regulation (EU) No. 139/2014. To be precise, AMC1 ADR.OR.D.005(b)(11) (e)(1) requires aerodrome operators to comply with the following:

*The compliance monitoring itself should also be audited according to a defined audit schedule.*

As audits have to be independent and functions must not audit themselves, an external audit is an effective and efficient solution to comply with this AMC.

airsight conducted an on-site audit of the EASA Compliance Monitoring System (CMS) at Düsseldorf Airport (DUS) as per the above-mentioned requirement. By awarding the audit to airsight, the client benefited from the following advantages:

- Independent and external feedback on the compliance status of the CMS. This includes valuable recommendations based on airsight's experience in the industry.
- The audit was conducted in compliance with the requirement ADR.OR.D.005 (incl. respective AMCs).
- The airsight audit report serves as evidence for oversight audits of the Competent Authority regarding the above-mentioned requirements.



Photo Credit: © Flughafen Düsseldorf/ Andreas Wiese

The audit was prepared by the experienced airsight audit team based on documents provided by the client. Doing so, the auditors identified areas of interest which were further verified during the on-site audits. The overall process of the external audit was based on the Guidelines for Auditing Management Systems (ISO 19011:2018).

A detailed audit plan was created by airsight which included respective time slots for each topic and related subtopics. The coordination between DUS and airsight was characterised by professional, open and efficient communication. This was the key to ensure that all topics could be covered within the agreed timeframe.

The audit focused on the organisational structure of the CMS at DUS (incl. personnel requirements and training), documentation (e.g. processes, manuals) and the main oversight activities of the CMS (i.e. audits and inspections). Besides that, the topic of change management and the management of the aerodrome manual were main pillars of the audit plan.

During the closing meeting, the results and impressions were presented to the EASA Compliance Manager and Accountable Manager of DUS. The outcomes of the audit were gratefully received by the client, and ideas for implementation and process adjustments were discussed. Doing so, DUS does not only fulfill the regulatory requirements but also even strives for further improvement of its CMS processes, ensuring safe and efficient aircraft operations.

Services: Airport Certification, Auditing

# airsight projects



## **Brandenburg State Ministry for Infrastructure and Regional Planning** **Technical Assessment within the Approval Procedure of Berlin Brandenburg Airport**

The expansion of Schoenefeld Airport into Berlin Brandenburg International Airport is Europe's biggest airport project. Before the airport goes in operations, it has to receive the approval of the responsible authorities – in this case the Brandenburg State Ministry for Infrastructure and Regional Planning.

In cooperation with its partner TÜV NORD CERT, airsight provided during three years the authorities with aeronautical engineering expertise and support for the verification of the airport's compliance to national and international regulations, as well as for the assessment of the technical and operational condition of the infrastructure.

Services: Compliance Assessment

## **Airbus - Hamburg Finkenwerder Aerodrome** **ATC Safety Assessment of Ship Traffic Crossing Arriving and Departing Air Traffic**

60 metres high container ships and cruise ships like Queen Mary 2 serving the port of Hamburg represent significant obstacles for the air traffic at Airbus - Hamburg Finkenwerder Aerodrome. airsight carried out in 2009 an EUROCONTROL ESARR 4 compliant ATC Safety Assessment of this unique situation. Structure interviews and workshops with all involved stakeholders were conducted in order to identify the hazards, model and quantify the risks, and propose efficient mitigation strategies.

Services: Air Traffic Management, Safety Assessment





# airsight projects

## Wind Energy and Aviation

Wind energy is one of the most sustainable alternatives to burning fossil fuels and becoming more and more popular. However, the increasing size of modern wind turbines can create hazards to aviation, especially when placed too close to aerodromes and flight routes.

What are the potential hazards?

With increasing sizes, modern wind turbines reaching heights of up to 250 m above ground level, as physical obstacles they may create hazards to for low-flying aircraft. Often, the greatest problems are near small general aviation aerodromes. But also, larger airport, low-flying zones and corridors as well as helipads needs to be considered. So called Obstacle Limitation Surfaces (OLS) around aerodromes as well as further areas and zone for the protection of flight procedures need to be assessed.

In addition, rotating blades of wind turbines create turbulences downwind. Especially for small and light aircraft such turbulences may be dangerous. Although further research about safe distances to wind turbines still need to be conducted, some guidance is available and needs to be considered. Often, the wind turbine induced turbulences are considered to be more restrictive than the obstacle clearance requirements.

Furthermore, wind turbines may have an impact on communication, navigation and surveillance (CNS) facilities, such as radar and VORs. Managing potential risks

in advance, or mitigating them where needed, is necessary to ensure safe flight operations.

For the local municipalities, the lights on wind turbines often is considered annoying. At the same time, obstacle lighting according to international rules, or national derivations thereof, is of high importance for aviation safety. Although some mitigation is available, such on demand obstacle lighting or special obstacle lights with reduced lighting towards the ground, the balance often remains difficult.

airsight supports developers as well as aviation authorities with an independent assessment of the potential impact on aviation hazards created by wind turbines. In the past months and years, airsight conducted numerous studies related to wind farms and aviation safety, and reinforced its leading position in this field. The projects addressed typical issues of proposed wind turbines representing physical obstacles near aerodromes and its flight procedures. Also, wind turbine induced turbulences are considered for these cases. Also, with regards to obstacle lighting, airsight conducted many studies addressing proposed lighting of wind turbines being non-compliant to national's specific regulation. Where CNS facilities would have been affected by wind turbines, airsight conducted feasibility studies on the removal, relocation and replacement of such facilities, including adjustments of published instrument flight procedures.

[Services: Airport Safeguarding, Sustainable Aviation](#)



# airsight projects

## Mapping of Obstacle Limitation Surfaces (OLS) and Aeronautical Studies

Safe airport operations require a permanent monitoring and assessment of possible infringements of the Obstacle Limitation Surfaces (OLS), as prescribed in the relevant regulations such as ICAO Annex 14 and EASA CS-ADR-DSN. These Obstacle Limitation Surfaces (OLS) “define the airspace around aerodromes to be maintained free from obstacles so as to permit the intended aeroplane operations at the aerodromes to be conducted safely and to prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes.”

airsight assists airport operators, airspace users and project developers in managing new or existing objects and constructions while ensuring aviation safety.

In the past months and years, airsight prepared numerous maps of aerodromes' Obstacle Limitation Surfaces (OLS). Other aspects such as flight procedures and CNS facilities can be considered for the determination of more extensive aerodrome safeguarding maps as well.



In addition, airsight conducts independent assessments of obstacles, so called aeronautical studies, to ensure that safety of operations is not impacted. In more than 100 studies airsight has proven it is one of the leading experts in the domain of obstacle assessments and aeronautical studies.

[Services: Obstacle Assessments, Airport Safeguarding](#)



## Halifax Stanfield International Airport Review of airport winter operations

Due to the complex and often unpredictable nature of inclement weather events, airports worldwide face challenges in managing operations during the winter months. Runway contamination and strong winds play a role in most runway excursion incidents. It is challenging and often not viable to maintain all runways, connecting taxiways and other related surfaces free of contamination. Therefore, it is of particular importance for airports to be well organised and properly manage the status of the runway and anticipated information distribution.

With the implementation of the new Global Reporting Format (GRF) for runway surface condition assessment and reporting airports are confronted with additional challenges. Procedures need to be adapted, personnel trained and eventually new technology implemented. airsight supports in reviewing procedures and documentation for completeness, comprehensibility and structure to create a baseline for transparent decisions and collaboration with stakeholders.

[Services: Operational Reviews](#)

# airsight projects

## EASA Study on the Triple One Concept “One Runway, One Frequency, One Language”

Runway incursions are one of the biggest threats in relation to runway operations at airports worldwide. Loss of situational awareness by pilots or vehicle drivers and poor communication between controllers and parties on the manoeuvring area can be considered as the main contributing factors. To improve situational awareness, Eurocontrol recommends in the „European Action Plan for the Prevention of Runway Incursions“ (EAPPRI) the use of a single frequency for all movements associated with a runway, using Aviation English. This is referred to as the „Triple One Concept“. Knowing what is happening on and around the runway can add a final safety barrier to the system.

However, in order to implement the „Triple One“ concept, certain requirements must be met that are not always easy to realise. These include increased English proficiency requirements for operational ground personnel, which can pose major challenges for airports considering the variety of conditions in which they are operated. The seemingly obvious safety gain of using a single frequency for all movements on a runway also entails difficulties, such as additional frequency load. For reasons like these, the concept is controversially discussed among European airports. For those or other reasons, the “Triple One” concept is not widely implemented at European airports.

EASA aims to get a comprehensive picture of the current state of implementation at all airports within the EASA scope in order to be able to make a thorough and objective analysis of the safety gains and possible risks or operational disadvantages. For this purpose, EASA has initiated a call for tender to investigate the current status of the implementation of the individual elements of the „Triple One“ concept in a study. Based on the study results and its recommendation, the European legislator will subsequently decide to what extent the „Triple One“ concept should be taken into account in future legislation.

airsight was commissioned to conduct the study in cooperation with Brussels Airport Company. Broad stakeholder participation is a central part of the analysis to understand the different implementation options of „Triple One“, advantages and disadvantages as well as potential impact, e.g. on costs and the background of implemented concepts. A series of questionnaires, interviews and workshops will be part of the study, involving ACI Europe is assisting as one of the partners.

Services: Aerodrome Safety, EASA Study





# airsight projects

## Lanthan Safe Sky

### Type Approval of First Aircraft Detection System for Obstacle Lighting based on Transponder Signals

airsight, as authorised entity by the German Ministry of Transport to verify transponder-based aircraft detection systems for obstacle lighting, has approved the first system in Germany.

airsight has been entitled in April 2020 by the German Federal Ministry of Transport and Digital Infrastructure (BMVI) as first authorised entity to verify aircraft detection systems for obstacle lighting based on transponder signals.

#### Type Approval of Aircraft Detection Systems

Since its entitlement by the BMVI, airsight has been validating the design and functionality of such aircraft detection systems relying on an extensive approval process incl. detailed reviews of both the hardware and associated software.

As part of the type approval, the aircraft detection system is to be validated by demonstration flights on a real installation. The validation flights are carried out both with „conventional aircraft“ as well as with drone / unnamed aircraft vehicle (UAV) equipped with complex equipment to conduct extensive testing at all flight altitudes.

The aim of the type approval is to ensure that the tested systems meet all applicable regulatory requirements as well as the high aviation safety standards. For this purpose, an extensive list of criteria was developed and used to assess the safety, quality and reliability of the detection systems.

#### First Type Approval in Germany

airsight granted the type approval for the first aircraft detection systems for obstacle lighting based on transponder signals in Germany, from the manufacturer “Lanthan Safe Sky”.

During an approval process lasting a few months, Lanthan Safe Sky was able to provide all the evidences required for validating the function and design of their system.

The validation flights, as important part within the procedure, were conducted in a wind-farm in Schleswig-Holstein.

Services: Aircraft Detection Lighting Systems, Site Assessments, System Verification





# airsight projects

## Site Assessments for Aircraft Detection Systems at Wind Farms

Wind turbines can pose a hazard to low-flying aircraft. For aviation safety reasons, relevant aeronautical obstacles and wind farms must be lit at night. However, obstacle lighting at wind farms is often perceived as disturbing by residents and have frequently led to resentment among the local population in the past.

Some States require or allow the equipage with an aircraft detection system for obstacle lighting. These systems activate or deactivate the lighting depending on the presence of aircraft in the vicinity of a wind farm. Among other things, this is intended to increase public acceptance of wind energy and its expansion and reduce the impact on the environment.

airsight has been designated by the German Federal Ministry of Transport and Digital Infrastructure (BMVI) as an authorized entity for verifying aircraft detection systems and can therefore both carry out the necessary type tests with the manufacturers as well as investigate the site-specific fulfillment of the requirements for the wind farm in question.

The verification of the site-specific compliance, or the site assessments respectively, include on the one hand flight operational aspects, on the other hand the local conditions and the system functions at the site are also taken into

account. Among other things, the coverage of the effective area (e.g. possible shadowing due to topography), the connection to wind farm and communication networks, but also sufficient switching times of the lighting must be ensured.

For this purpose, airsight is in constant contact with the civil aviation authorities. If necessary, possible challenges and solutions are coordinated with the responsible authority at an early stage. This provides operators with an efficient process for approving such aircraft detection lighting systems.

In the past months, airsight has investigated numerous wind farms and prepared site assessments for the manufacturers Lanthan Safe Sky and Deutsche Windtechnik. The first aircraft detection systems were successfully put into operation, including wind farms in Schleswig-Holstein and Rhineland-Palatinate.

Services: Aircraft Detection Lighting Systems, Site Assessments, System Verification



# airsight projects

## SEA Milan Airports Technical Feasibility Studies of Potential Vertiport Locations across Italy

airsight, as pioneer in eVTOL vertiports planning, design and operations, has been chosen to support SEA Milan Airports in conducting technical feasibility studies of potential vertiport locations in the greater region of Milan and Lombardy.

Technical feasibility studies are crucial to explore the deployment of eVTOL vertiports. With these site assessments, airsight will be able to offer an initial appraisal of the future vertiports' viability and compatibility with aviation regulations and technical requirements.

airsight has been selected as a partner in this project because of its experience with vertiports and its multidisciplinary competences that can provide a 360° view and analysis on this challenging topic. Furthermore, the implementation of vertiports requires



planning and design, operation, obstacle and flight procedure expertise, which are airsight's core competences and can be provided all in one.

[Services: Feasibility Studies](#)



## TS Shipping OÜ Offshore Helideck Inspection on an icebreaker

Our consultants had the chance to perform an offshore helideck inspection (shipboard helipad) in Greenland on behalf of the very professional team of TS Shipping OÜ on Icebreaker Botnica!

To be prepared for future helicopter operations, helidecks have to be regularly inspected and certified. The main target of the inspection was to check the current condition of e.g., the helideck markings, lighting, rescue and firefighting systems and the obstacle situation.

The inspection was conducted according to the standards of CAP 437 and other applicable regulations like ICAO

Annex 14 Vol. II and ICAO Doc 9261. Besides expanding the offshore inspections of airsight to other European countries, our consultants also enjoyed the incredible view!

airsight offers offshore and shipboard helideck inspections, grip testing and inspections of winching areas on wind turbines, including a detailed inspection report and proof of the compliance status.

[Services: Helideck Inspection](#)

# airsight projects

## 3D simulation of approaches, taxiing movements and airport infrastructure

Safety is a top priority at airports worldwide. In this regard, national and international regulations provide a framework to ensure the safety of airport operations. However, due to varying local conditions, it is not always possible to comply with all infrastructural requirements without restrictions. Any deviations as well as changes in the airside infrastructure can, though, inhabit risks that need to be investigated and evaluated. A realistic assessment of hazards can be carried out by visualising the existing situation. airsight creates detailed 3D models based on the XPlane software in order to carry out simulations for various requirements.

The extent to which a deviation from regulatory requirements affects flight operations is best assessed from the perspective of the airport users, the pilots. Differences from prescribed values cannot always be perceived with the naked eye. For this purpose, airsight simulates approaches or ground movements from the cockpit perspective. By comparing simulation results of the situation with existing deviations to the scenario that conforms to the specifications, well-founded statements about risks can be made.

Depending on the extent of the risk, measures must be taken to reduce the risk. However, mitigations found in theory do not always turn out to be practicable in reality. 3D simulation models can help to visualise and evaluate the visual impression of different arrangements of lights, markings and/or signs to support pilots' navigation and situational awareness.

Sometimes it is also necessary to increase the meteorological minimum visibility for flight operations due to existing deviations or changes in infrastructure. In this context, visibility is not a rigid value, but rather there is a smooth transition from the visible to the no longer visible range, which varies depending on light and weather conditions. As a result, previously calculated values may appear different in reality. With the help of 3D models, airsight can simulate operational visibilities and cloud ceilings close to reality to draw conclusions about required restrictions to the minimum meteorological visibility.

Based on the knowledge gained from the simulations, well-founded recommendations can be derived and options that go beyond the recommendations in guidelines and regulations can be jointly developed.

Services: Airport & Air Traffic Control Safety



# airsight projects



## Offshore Helideck Inspections

There is today an extensive expansion of offshore wind turbines, especially in Europe in the North Sea and Baltic Sea areas. As the turbines are located further and further away from the mainland, the crew transport by ship or CTV (crew transfer vessels) is very time-consuming. The solution is to perform crew transport via helicopter to helidecks mounted on the platforms. Such helideck has however to be initially certified and requires an annual inspection as part of their maintenance program.

Depending on the location of the platform and the helideck, a wide variety of regulations have to be followed. In addition to ICAO Annex 14 Volume II Heliports and ICAO Doc 9261 Heliport Manual, airsight applies other national guidelines for the inspections, such as CAP 437 (Standards for offshore helicopter landing areas, UK) or AVV No. 246a (Allgemeine Verwaltungsvorschrift zur Genehmigung der Anlage und des Betriebs von Hubschrauberflugplätzen, Germany), in their respective current versions, to maintain the compliance status.

airsight's team, consisting of aviation experts with many years of experience, assists its clients in the implementation of certification inspections and supports them with expert opinions in obtaining and maintaining certification with the relevant authorities.

Within the scope of new projects and helidecks, airsight also provides support in the execution of factory acceptance tests (FAT), side acceptance tests (SAT) and friction testing from the aviation-specific point of view prior to the certification and beyond.

airsight aeronautical inspections services also include winching areas on wind turbines: inspections are conducted to ensure safe and cost-efficient operation of helidecks and winching areas and facilitate the working conditions in the offshore sector for our clients.

airsight's services around offshore helidecks and winching areas:

**Offshore Inspections:** Inspections of existing offshore helidecks and winching areas on wind turbines

**FAT and SAT, friction testing:** Conducting factory acceptance tests and side acceptance tests for new projects and helidecks as well as friction testing

**Achieving and maintaining the compliance status:** airsight uses multiple regulations to ensure safe and compliant operations of your helideck, e.g. ICAO Annex 14 Volume II, ICAO Doc 9261, CAP 437, AVV 246a

Our offshore experts are certified for offshore operations according to Global Wind Organisation (GWO) Basic Training Standard.





# airsight projects

## Federal State of Schleswig-Holstein

### Expert Advice for the Establishment of PinS Flight Procedures for Helicopter Air Rescue Services (HEMS)

In spring 2023, airsight has been commissioned by the Ministry of Justice and Health (MJG) of the Federal State of Schleswig-Holstein to provide an expert advice on the establishment of PinS flight procedures for helicopter air rescue services (HEMS) in Schleswig-Holstein (SH).

The objective is to serve potential approach and departure points for helicopter landing sites at hospitals and air rescue stations as well as for North Sea island operation sites with point-in-space flight procedures (PinS) and to link these with a route network optimized for helicopter rescue flights.

Point-in-space flight procedures are approach and departure procedures exclusively for helicopters that rely on satellite navigation. The actual approach and departure between a defined reference point („point in space“) and the landing site takes place visually and requires sufficient meteorological conditions to allow the pilot to see and avoid any obstacles. Together with an optimized route network for instrument flight, the envisaged procedures allow rescue flights to be conducted in weather conditions in which pure visual flight is no longer possible. They thus increase the usability, reliability and safety of flight

operations for the air rescue service.

In this project, flight routes are to be designed within the application for approval to be submitted for PinS flight procedures. In particular, it is to be examined whether and to what extent flight operations would affect interests worthy of protection with regards to noise, safety and environment. If such concerns are affected, alternative flight paths must be developed to minimize the negative impacts.

In order to meet the diverse needs of users and affected parties alike, workshops are planned to discuss, for example, the weighing of concerns worthy of protection. The findings from these workshops will be directly incorporated into the conceptual design of the PinS flight procedures and route network, as well as into further support for the preparation of the application for approval, including adjustments of published instrument flight procedures.

Services: [Airport Safeguarding](#), [Flight Procedure Design](#), [Heliports & helipads](#)



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# airsight projects

## On-site Airport Inspections – West Africa

Our airsight inspectors were deployed in West Africa to perform several airport inspections to assess the compliance status with regards to ICAO Annex 14.

airsight can look back on many challenging airport inspections in several different countries such as Seychelles or Cameroon. In this particular case the greatest challenge was to meet the very tight timeline of the client. The period between the first contact and the airsight team touching down on African ground was only three weeks. Of course, many requirements regarding vaccination, visa and travel arrangements had to be fulfilled in this short timeframe.

The objective of the on-site inspections was to provide the client with a compliance status for more than five airports according to ICAO Annex 14. Based on the observations, our inspectors developed possible solutions to rectify any non-compliances with a proposed action plan. On-site, the airsight inspectors were accompanied by the local airport staff to ensure the safety and efficiency of the inspections.

For projects like this one, airsight can choose inspectors from its experienced resident pool of engineers. Comprehensive checklists, measuring devices as well as geo-referenced cameras allow the team to assess the compliance status of airports. A great portion of work is also performed remotely using satellite photos, CAD-files or existing photo documentations.

Services: [Airport Certification](#), [On-site Inspections](#)



# airsight projects



## Saxon State Office for Environment, Agriculture and Geology Assessment of eco-efficient flight procedures at Leipzig/Halle Airport

airsight examined in this research and development study whether the aircraft noise impact in the airport vicinity of Leipzig/Halle airport (EDDP/LEJ) could be reduced by optimizing vertical profiles of existing approach and departure procedures. The effects on CO<sub>2</sub> emissions from approaches and departures were also investigated. The aim of the study was to identify eco-efficient approach and departure profiles that reduce both noise exposure and CO<sub>2</sub> emissions in the vicinity of Leipzig/Halle airport.

Leipzig/Halle airport is characterized by a strong portion of flights during night time. An optimization of flight procedures w.r.t. aircraft noise therefore appears reasonable to further improve the noise situation around the airport.

For the development of study variants, it was necessary to evaluate the current state of research in the field of eco-efficient approach and departure procedures. Based on this literature review, expert interviews and a workshop with relevant stakeholders was conducted (inkl. representatives of airlines, air traffic control and airport operator) to develop study variants for arrivals and departures based on the following criteria:

- Flight movements and representative aircraft types
- Approach and Departure procedures as published in the AIP
- Variation of vertical profiles for departures and comparison to baseline (Noise Abatement Departure Procedures with varying thrust reduction and acceleration Altitudes)
- Variation of vertical profiles for arrivals and approaches (e.g. steeper approaches or continuous descent operations)

After defining the approach and departure scenarios including different variants of operational procedures, the noise contours LA<sub>eq,day</sub> and LA<sub>eq,night</sub> as well as the flight-specific CO<sub>2</sub> emissions were calculated. Subsequently, the noise contours resulting from the calculation were intersected with population data to enable an assessment of the different variants with the help of scientific-based exposure-response-functions (ERF). The CO<sub>2</sub> emissions and the associated fuel consumption were quantified and compared on the basis of fuel costs. For calculation of aircraft noise and fuel consumption, airsight used the Aviation Environmental Design Tool (AEDT).

Services: Sustainable Aviation, Noise Assessment

# airsight projects

## **Berlin Brandenburg Airport**

### **Cost-Benefit Analysis for the Operations of Apron Control Services**

Due to the high traffic volume expected at Berlin Brandenburg International Airport, Apron Control Services will be provided by a dedicated ATC unit. These unit may be operated either by the National Air Navigation Service Provider, by an external service provider, or by the airport operator itself.

airsight analysed the cost and benefits of these three options, taking into account the operational constraints, the relevant national and international regulations, as well as the future manpower, equipment and facilities requirements.

Services: Cost-Benefit Analysis, Airport Operations

## **Austrian Federal Ministry for Transport, Innovation and Technology**

### **Development of a Training Policy and Training Programme for the Civil Aviation Department**

As required by ICAO, national safety oversight organisations must determine the minimum professional qualifications of their technical personnel and also provide the required training necessary for them to effectively accomplish their duties.

Accordingly, airsight developed on behalf of the Austrian Federal Ministry of Transport the mandatory Training Policy and Programme, as well as a Training Plan, ensuring that the CAA employees are well-trained for their activities.

Services: Training Programme



airsight is an experienced and well-established Berlin-based company providing airports, air navigation service providers as well as civil aviation authorities, project developers, energy service providers and other organisations with consulting, engineering, inspection and training services worldwide.

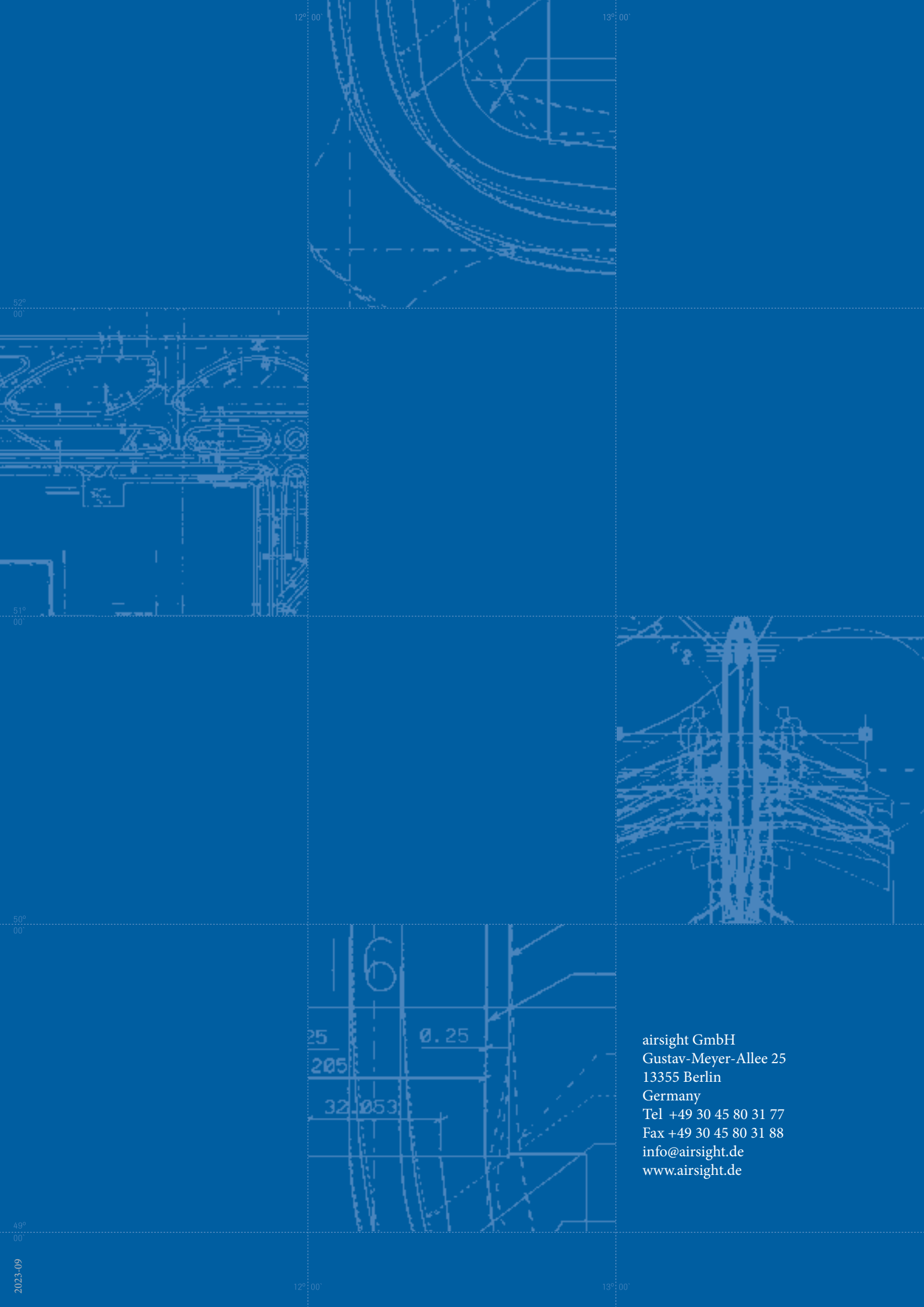
The airsight portfolio includes topics such as aerodrome, heliport and vertiport certification, design, and operation as well as safety assessments, flight procedure design, obstacle assessments, sustainable aviation, compliance management and various training, inspection, and other services.

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