Resilience by design

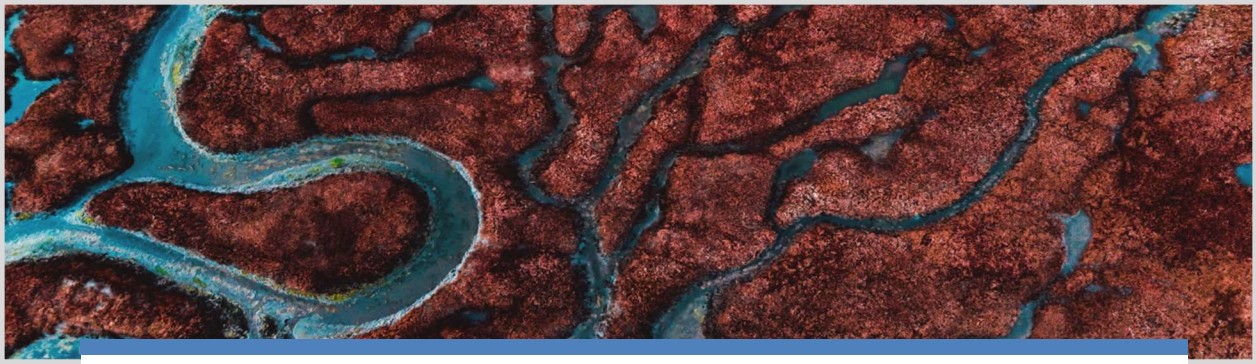
The new era of
Airport Resilience
Assurance Cycles

A commitment to continuous validation



Airport Intelligence

Guiding you to strengthen your resilience



Why Resilience Assurance Cycles are the future of resilience

In today's rapidly evolving risk landscape, resilience cannot be treated as a one-time achievement. Traditional certification models often provide a static assurance as a snapshot in time that quickly becomes outdated as new threats emerge and systems change. Airports, in particular, need a dynamic approach that ensures resilience is continuously maintained, tested, and improved.

Airports operating without a structured and recurring approach to preparedness face significant challenges: readiness efforts become fragmented over time, staff capabilities degrade due to turnover, and lessons identified during major exercises rarely translate into sustained operational improvement. Mandatory regulatory exercises—often conducted only every one or two years—cannot keep pace with evolving risks, increasingly complex airport operations, or the shifting responsibilities across internal teams and external stakeholders. As a result, plans drift out of date, coordination weakens, and the organisation becomes increasingly exposed to disruption. To close this growing preparedness gap, airports require a structured, multiyear rhythm of practice, evaluation, and refinement—captured in what we define as a **Resilience Assurance Cycle**.

This whitepaper explores **Resilience by Design**, a principle that embeds resilience into the core of airport processes and which is further embedded into the principles of **Total Airport Management** when pursuing operational excellence to the fullest. We introduce the concept of **Resilience Assurance Cycles**, a structured, ongoing process that replaces one-off certifications with a continuous rhythm of assessment, learning, and improvement. Anchored on the principles of the Deming Cycle (Plan-Do-Check-Act), this model embeds resilience into daily operations by repeatedly planning updates, conducting exercises, and evaluating outcomes. You discover **why Resilience Assurance Cycles are essential** for organisation seeking to stay ahead of evolving risks and compliance requirements while maintaining a living, continuously improving state of readiness. Finally, we present the **Dual-Layer Resilience Model**, which combines Emergency and Business Continuity to create a robust, future-proof framework building upon the operational coordination strengths of the Airport Operations Centre. Together, these elements form a comprehensive approach to resilience that is proactive, sustainable, and adaptable.

1 | Driving embedded resilience

Airports around the world are increasingly facing crises; from sudden security breaches to drone intrusions and large-scale operational disruptions that leave thousands of passengers stranded. In those moments, it is up to you as an airport to respond in the most efficient way possible and with a plan that protects safety and security, while ensuring passenger experience. But how do you handle such high-pressure situations when every second counts and the stakes are so high?

The answer to coping with crises lies in preparation, coordination, and designing resilient systems that can absorb shocks without collapsing. These systems must in turn be reinforced through continuous certification and improvement cycles supported by regular exercises that provide a structured way to test whether an airport's plans, processes, and capabilities remain sharp and up-to-date, and effective under pressure.

Resilience is not something that simply appears in moments of crisis. It is something we build, intentionally, long before we need it. Resilience by design is the practice of shaping the management systems and teams to anticipate disruption, adapt with agility, and emerge stronger. Instead of waiting for crises to unfold, this proactive approach avoids unnecessary issue resolution and further escalation, ultimately ensuring that flexibility and robustness are built directly into the way an airport prepares for and manages disruption, enabling it to respond with confidence even under intense pressure.

Because airports are classified as critical entities, many operational standards are not optional but set by regulation

Too often, airports scramble to deliver the mandated full-scale exercise, only for preparedness efforts to go dormant again until the exercise in two years. By integrating resilience planning and repeatedly assessing performance, identifying gaps, and implementing corrective actions, airports ensure that resilience is not a one-time effort but a continuous, measurable process. And this is not merely best practice. According to EASA regulation and being a critical entity, it is a mandatory regulatory obligation to demonstrate compliance with stringent safety and operational standards. An airport is to prove that its systems, people, and processes are capable of responding effectively to disruptions of any scale.

When resilience is built into the airport processes and repeatedly assessed through regular, structured evaluation, airports move beyond merely surviving disruptions and emerge stronger with each assessment cycle.

Resilience is not something that simply appears. Resilience by design is the practice of shaping your airport for future readiness

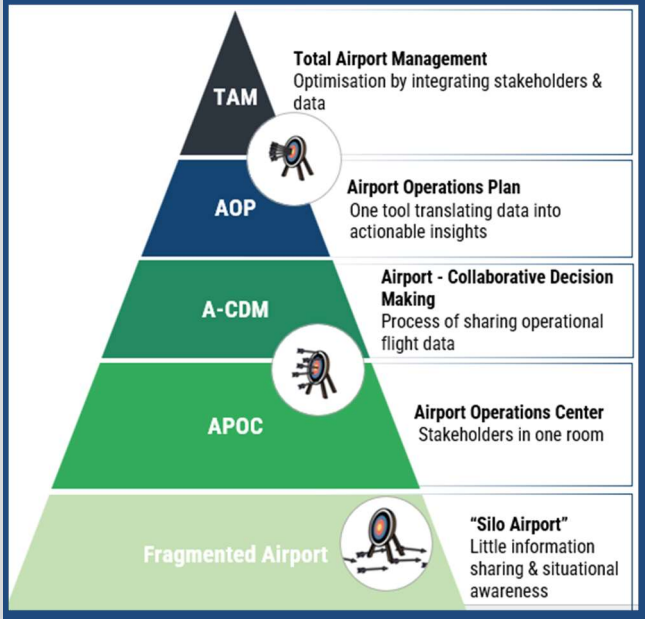
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Compliance references: Critical Entities Resilience Directive (CER)

2 | Transitioning from reactive to proactive resilience

As airports shift toward a more proactive, data-driven and holistic operating model, Total Airport Management (TAM) becomes a key enabler. By unifying operations into a single view, TAM enhances the airport's ability to identify, assess and respond to disruptions and risks with greater speed and coordination.

Essential building blocks towards Total Airport Management



Total Airport Management (TAM) is not just a tool, it is a philosophy, a holistic vision for optimising airport operations. Airport Intelligence's approach is to integrate technology, processes, and people to create a smarter, more connected airport ecosystem. By bridging traditionally siloed domains such as passenger, baggage, aircraft and cargo flows, TAM fosters seamless coordination across all airport functions and over different time-domains. This data-driven approach helps airports rethink and refine their processes, enhancing efficiency, resource utilization, safety, and sustainability. Collaboration is at the heart of TAM, by working closely with all stakeholders and supporting you in doing so, we ensure that operations are not only optimised for today but also strategically planned for the future. Built on key pillars like A-CDM, APOC, AOP, Stakeholder Management, and Change Management, this approach empowers airports to unlock their full potential with the assets they already possess.

By embedding ERM and BCM principles such as risk ownership, resilience controls, and recovery priorities, into TAM's collaborative decision-making and performance processes, airports can transition from reactive crisis handling to proactive resilience.

This alignment ensures that risk insights feed into daily operations, operational data strengthens continuity planning, and both disciplines reinforce a more resilient and predictable airport ecosystem with the ultimate goal to pursue operational excellence and being future-proof with a vision focused on TAM.

- Emergency Response Management (ERM) benefits from TAM's cross-stakeholder situational awareness, which enhances early detection of operational, safety, security, and capacity-related risks.
- For Business Continuity Management (BCM), TAM supports the continuity lifecycle by enabling real-time impact analysis, resource allocation, and scenario-based decision-making.

insight

When an incident occurs, teams naturally focus on resolving the issue itself, while the APOC focus is to concentrate on understanding and managing its wider operational impact. In a power failure, for example, technical experts work on restoring the system, while the APOC assesses the impact of the disruption, coordinates as needed, and ensures clear communication. Keeping these activities distinct prevents confusion and enables the APOC to organise continuity based on reliable downtime estimates provided by technical teams.

3 | Introducing the Resilience Assurance Cycle

Aerodrome operators are required under EASA regulations to establish an internal audit and compliance-monitoring framework as part of their management system. This ensures that all operational and safety-critical processes are systematically reviewed and remain compliant with EU aviation requirements. This obligation is explicitly reflected in EASA's management system rules, which mandate internal auditing and continuous monitoring of key processes supported by structured audit schedules and review cycles. To meet these expectations in a sustainable manner, airports benefit from implementing a Resilience Assurance Cycle**,** a structured programme supporting the need to maintain compliance with EASA regulations and recognised quality standards. Hence, findings are not only identified but also acted up on, preventing erosion of organizational knowledge that often occurs between regulatory oversight cycles.

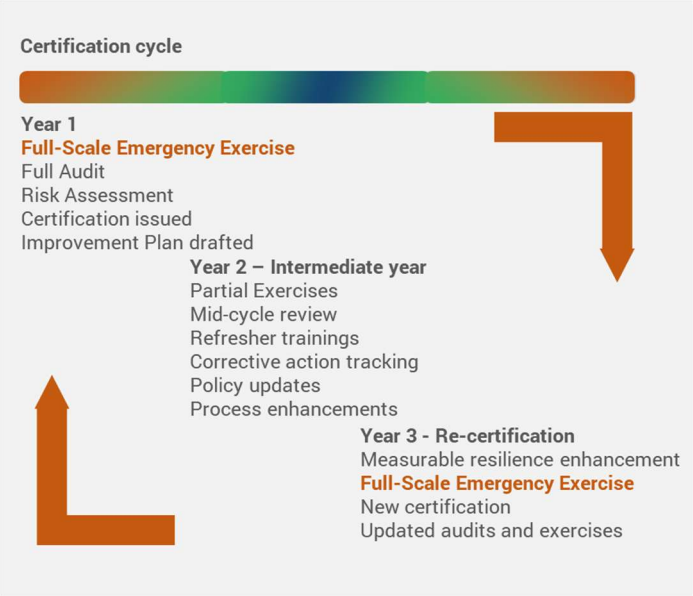
Faced with time, budget, and resource constraints, airports frequently live from one full-scale exercise to the next. A Resilience Assurance Cycle breaks that tendency as it is an iterative programme that spans multiple years with an initial certification, intermediate year, and certification renewal. For ongoing compliance and to maintain the obtained certification, surveillance audits are conducted periodically, typically annually, during the intermediate year(s). The Assurance Cycle thus embeds ongoing audits, follow-up actions, and periodic exercises into daily operations.

This approach maintains regulatory compliance, aligns with leading industry standards, and enables proactive risk management throughout the assurance cycle.

Biennial and triennial cycles

Understanding the cycle starts with defining its timeframe, which in turn requires a closer look at the regulation and best practice standards. An Aerodrome Emergency Certification Cycle operates on a two-year basis according to EASA regulations, whereas ISO 22301 standards establishes a triennial cycle for Business Continuity certification.

The cycle can be divided in three stages as per the example for emergency below:



- **Initial certification**: The cycle starts after the issuance of the EASA certification by means of a full compliance assessment.
- **Intermediate Year(s)**: During the intermediate year(s), focused reviews ensure continued adherence to safety and operational standards addressing any changes or corrective actions identified during the initial certification. Surveillance Audits are organised on an annual basis.

- **Certification renewal**: In the final year of the cycle, a comprehensive recertification audit is conducted to renew the certificate, focusing on continuous improvement and sustained effectiveness of the management system.

With all required activities completed and the necessary evidence validated, the renewal phase brings the Resilience Assurance Cycle to a formal close, ensuring the organisation is fully prepared for the next cycle period. Once closed, the cycle starts anew.

Airport Intelligence's dedicated team brings the operational depth and aviation expertise needed to drive a strong and consistent implementation of the Resilience Assurance cycle. With seasoned experts who know the aviation industry, we guarantee aviation knowledge and ensure a consistent implementation of the cycle providing continuity, strategic guidance, and a clear red thread that keeps the entire programme aligned and progressing with confidence thanks to their deep organisational knowledge built over time.



Stop firefighting.
Start reducing costs.

*Investing in a structured, recurring Resilience Assurance Cycles is not simply a matter of compliance. It is a **strategic choice** that enables an airport to anticipate emerging risks, protect its reputation , and realise clear financial advantages.*

Disruptions can occur at any time, and the financial or reputational impact of even a short-lived incident can be significant. By proactively managing risks, particularly in the 24 hours leading up to operations, an airport can prevent avoidable disruptions and reduce the hidden costs associated with reactive management.

- **Greater operational efficiency**
- **Less stand-by**
- **Reduced operational turbulence & related irregularity costs**

A well-designed assurance cycle ensures an increase in operational efficiency in which risks are identified early, mitigation actions are aligned across stakeholders, and operational decisions are based on the latest and most accurate information. This proactive approach limits the need for expensive standby or on-call resources for possible disruptions, and reduces the operational turbulence that often arises from last-minute decisions with all its associated irregularity costs.

For a medium-sized airport the cost for a full-scale emergency exercise can easily run up to more than €80.000, especially when including expert facilitation, realistic simulation, and multiagency coordination. By shifting to proactive, year-round preparedness, airports typically reduce crisis-related OpEx by 10–20% and lower the cost of future full-scale exercises by up to 30%, as the organisation is already in a higher state of readiness.

- **Reduce OpEx by 10-20%**
- **Lower exercise cost by up to 30%**

Investing in resilience by design, takes away the overhead costs, and ultimately, the investment pays for itself: it enhances overall resilience, safeguards the airport's reputation, and significantly lowers the financial exposure linked to unplanned disruptions, ultimately even preventing them.

4 | Why a Resilience Assurance Cycle is essential

The value of a well-defined continuous Resilience Assurance Cycle stems from its ability to produce sustained, recurring outcomes for the airport rather than a single achievement.

Ensuring progress extends beyond a one-time milestone as needed in an Emergency Response and Business Continuity Management System. Its power lies in the ongoing process of planning, testing, adapting, and improving to stay ahead of evolving risks. In addition, sustained airport-specific knowledge -the expertise of Airport Intelligence- across all stages of the cycle, can even accelerate the process.

What you qualitatively gain as an airport

- **Year-on-year consistency**
- **Proper change management**
- **Staff engagement**
- **Sustained maturity growth**

Why a Resilience Assurance Cycle matters



Risks and threats evolve constantly

New technologies, organisational changes, geopolitical shifts, and emerging hazards mean yesterday's assumptions may no longer hold:

- Regular reassessment of risks
- Updated mitigation strategies
- Adaptation to new realities



Preparedness requires ongoing reinforcement

Skills fade, teams change, and processes drift in an ever evolving aviation industry. Assurance Cycles allow for:

- Recurring training and exercises
- Refreshing knowledge & roles
- Maintaining operational readiness



Plans must stay aligned with business priorities

Business continuity is only effective when it reflects the current structure, processes, and strategic direction of the airport. An Assurance Cycle ensures:

- Plans evolve with the business
- Dependencies and critical functions stay accurate
- Recovery strategies remain feasible



Responses improves through iteration

Every incident provides lessons, either big or small. An Assurance Cycle embeds:

- Post-incident reviews
- Lessons learned
- Continuous improvements

This turns experience into resilience



Continuity is a culture, not a document

A Resilience Assurance Cycle reinforces continuity as an ongoing mindset:

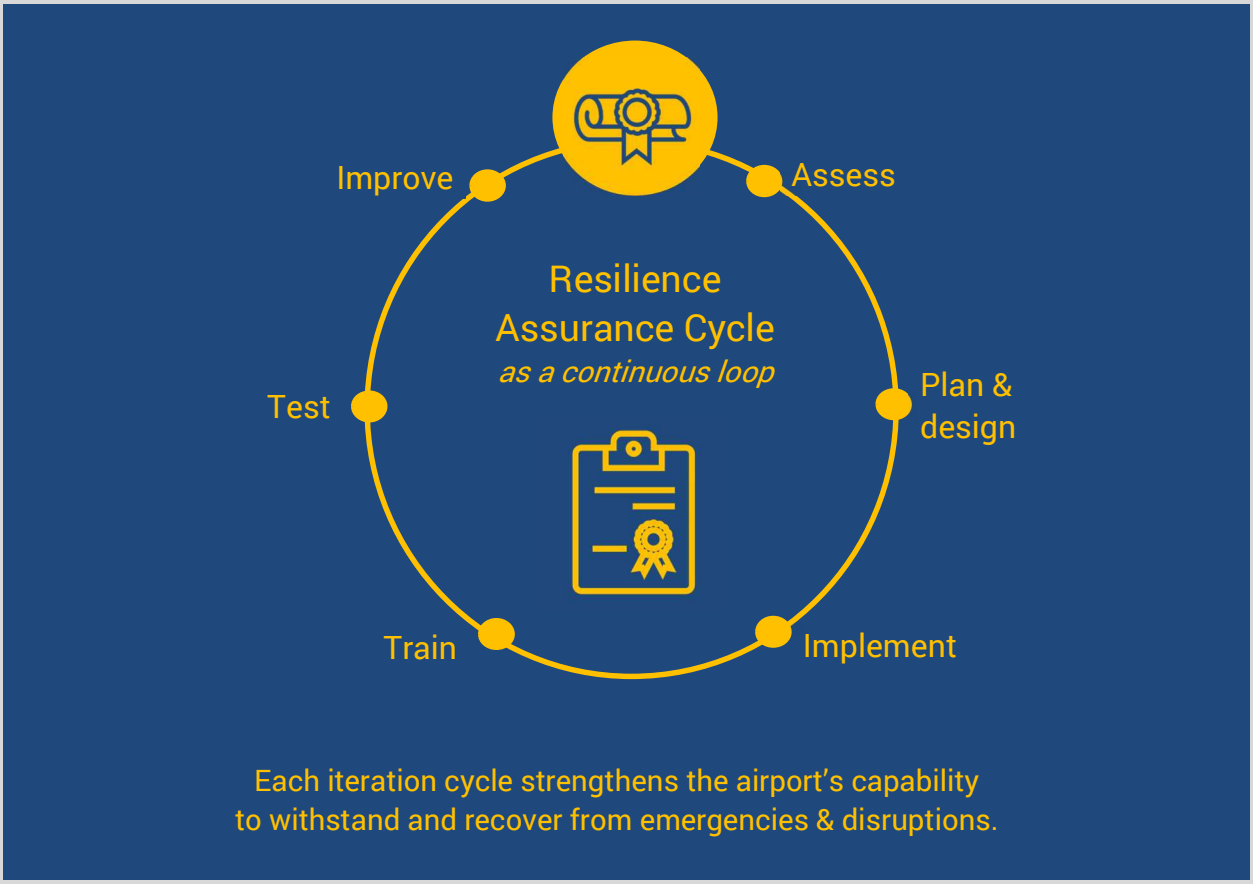
- Awareness stays high
- Roles & responsibilities remain clear
- Leadership stays engaged
- This is a cultural shift that ultimately strengthens airport resilience

5 | Dual-layer resilience model

A dual-layer resilience model can be anticipated through the implementation of a Resilience Assurance Cycle on two levels: an Emergency Assurance Cycle (EAC) and a Business Continuity Assurance Cycle (BAC).

- An EAC allows an airport to perform and test *emergencies* under real-world conditions.
- A BAC ensures a strong *continuity* foundation and maximising disruption prevention.

A continuous cycle is central to both emergency management and business continuity, not only from its regulatory essence but because these disciplines only work when they are treated as ongoing, evolving processes rather than one-off exercises. A static plan quickly becomes outdated while a continuous Assurance Cycle keeps an airport ready, resilient, and responsive.



Emergency Assurance Cycle (EAC)

Airport emergency planning is a critical aspect of the airport's certification. Despite Safety management systems prevention, ongoing safety inspections, emergencies might still happen.

The primary objective is to minimize the impact of an emergency, save lives, and maintain aircraft operations. An essential component of this cycle is a robust emergency plan, which is subject to regular audits and exercises.

Business Continuity Assurance Cycle (BAC)

Business Continuity is not just about compliance as a critical entity. It is all about confidence.

It demonstrates that the airport can protect critical operations and recover quickly when challenges arise. Certification builds trust with clients, partners, and regulators, while reducing risk and safeguarding your reputation. IT is a strategic investment in resilience, ensuring business continuity becomes a competitive advantage rather than a vulnerability.

6 | Airport Intelligence services at a glance

Building on the insights and frameworks outlined in this whitepaper, Airport Intelligence can support you with both the design and implementation of the proposed resilience approach to provide you long-term organisational resilience advisory. Our deep operational knowledge and proven experience enable us not only to help you establish the Resilience Assurance Cycle, but also to expand into broader areas such as TAM implementation, APOC optimisation, crisis management strengthening, targeted training, and exercise programmes.

More specifically in context of compliance, we offer integrated Enterprise Risk Management (ERM) and Business Continuity Management (BCM) services to safeguard your airport's resilience. These services complement the assurance cycle by providing a holistic approach to risk identification, mitigation, and operational continuity. Through ERM, we help you anticipate and manage strategic and operational risks by responding to emergencies, while BCM ensures that critical airport functions remain operational during disruptions for you as a critical entity. Together, these layers create a proactive, future-proof resilience strategy that goes beyond compliance, empowering your airport to thrive in an increasingly complex and unpredictable environment.

ERM

EMERGENCY PREPAREDNESS READINESS

Airport Intelligence can support your emergency response efforts

- **Emergency plans & procedures**
  Ensure aerodrome emergency plan updated and aligned with regulatory requirements
- **Emergency exercises & resources**
  Conduct tabletop, functional, and full-scale emergency exercises to validate readiness
- **Training programmes**
  Deliver refresher courses for staff every two years to maintain certification compliance
- **Certification & maturity assessments**
  Review existing emergency response procedures against international standards

BCM

BUSINESS CONTINUITY READINESS

Airport Intelligence can support your role as a critical entity

- **Business continuity policy & plans**
  Review and update overarching policy framework and detailed BCPs tailored to the organisational risks
- **BCP implementation and resources review**
  Ensure resources and governance structures support continuity objectives and plans are actionable at all levels
- **Plan testing & validation**
  Organise continuity exercises to test BCPs, e.g. pax/bag process disruption, power disruption, pandemic,...
- **BCP audit & certification**
  Conduct structured audits to validate compliance with ISO22301 or equivalent

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Reliable assistance for certification and oversight activities to strenghten your resilience

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