



PRELIMINARY REPORT

ANNUAL AFRICAN AVIATION RESILIENCE OUTLOOK 2027

Emerging priorities for resilient, trusted
and future-ready aviation across Africa

EVIDENCE | SYSTEMS | RESILIENCE

JULY 2026

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PUBLICATION STATUS

About this preliminary report

A disciplined starting point for the inaugural AAARO 2027

PUBLIC PREVIEW

This public preview sets the analytical frame, emerging signals and research agenda for the full Annual African Aviation Resilience Outlook 2027, scheduled for publication in January 2027.

The Annual African Aviation Resilience Outlook (AAARO) is the flagship annual publication of VLM Aviation Infrastructure Advisory. It is designed to support decision-makers across African aviation with structured, evidence-led insight on system resilience, emerging risks and strategic priorities.

The African Aviation Resilience Initiative (AARI) is VLM's flagship research and innovation initiative. AAARO is its annual flagship publication, translating carefully governed evidence and insights generated through AARI - alongside authoritative international and regional sources, stakeholder engagement and sector analysis - into a structured outlook for decision-makers.

This preliminary edition does not score, rank or certify States, regulators, airports, air navigation service providers, airlines or other organisations. It does not disclose proprietary assessment logic, algorithms, datasets or platform architecture.

Independence and attribution

AAARO is independently prepared and published by VLM Aviation Infrastructure Advisory. References to ICAO, CANSO, AFCAC, IATA and other organisations identify source material or sector context only and do not imply endorsement, partnership or approval.

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FOREWORD

Resilience must be designed into aviation's next chapter

African aviation is entering a period of significant opportunity. Expanding connectivity, digitalisation, new surveillance and navigation capabilities, emerging airspace users and renewed infrastructure investment can strengthen mobility and economic integration across the continent.

Yet greater connectivity also creates deeper interdependence. Operational disruption, infrastructure fragility, cyber threats, navigation interference, climate exposure, skills constraints and uneven institutional capacity can move rapidly across organisational and national boundaries.

Resilience therefore cannot be treated as a recovery activity that begins after failure. It must be designed into governance, technology, infrastructure, operations, people and partnerships from the outset.

This preliminary report establishes the analytical frame for AAARO 2027. It identifies early signals requiring further evidence, sets out the questions that the full Outlook will investigate, and invites constructive participation from regulators, ANSPs, airports, airlines, research institutions, technology partners and regional bodies.

THE CENTRAL PROPOSITION

Africa's aviation resilience will depend not on isolated technical improvements, but on the ability of institutions, infrastructure, people and digital systems to anticipate, absorb, adapt and recover together.

Victoria Mofolo

Founder and Principal Consultant
VLM Aviation Infrastructure Advisory (Pty) Ltd

EXECUTIVE SUMMARY

Nine connected priorities shape the preliminary outlook

The AAARO 2027 publication framework identifies nine focus areas. The preliminary assessment treats them as an interconnected system rather than separate technical silos.

Focus area	Preliminary signal
Operational resilience	Continuity must be designed across organisations, dependencies and degraded modes.
CNS/ATM systems and infrastructure	Modernisation must be accompanied by redundancy, integrity assurance and lifecycle sustainability.
Aviation cybersecurity	Cyber resilience requires governance, information sharing, incident readiness and operational integration.
AI and digital transformation	Value depends on data readiness, human oversight, assurance and accountable governance.
Safety, security and trust	Safety, physical security and cybersecurity risks increasingly intersect and must be governed coherently.
Climate and infrastructure resilience	Infrastructure planning must address physical climate exposure, energy continuity and long asset lives.
Governance and policy	Regional ambition depends on implementation capacity, accountability and cross-border coordination.
Capacity development	People, technical competence and institutional memory are critical resilience assets.
Innovation and emerging technologies	New airspace users and technologies require safe integration, proportionate regulation and common standards.

What the preliminary report concludes

- The resilience challenge is systemic: failures in power, communications, data, people or governance can cascade into operational consequences.
- Technology modernisation alone is insufficient unless continuity, maintainability, interoperability and trusted governance are addressed.
- Regional coordination and evidence-sharing can reduce duplication and strengthen collective preparedness.
- The full AAARO 2027 should prioritise verifiable evidence, African operating realities and practical action over broad aspiration.

SCOPE AND METHOD

A transparent evidence model

How the preliminary signals will become the full January 2027 Outlook

This public preview is a structured horizon scan. It synthesises authoritative public material and VLM's domain analysis to establish the research agenda for the full Outlook. It does not represent a continent-wide statistical assessment.

Evidence tier	Purpose	Examples
Tier 1: Institutional	Anchor the analysis in recognised global and regional frameworks.	ICAO plans and reports; CANSO guidance; AFCAC frameworks; regulator publications.
Tier 2: Operational and sector	Test how global priorities manifest in African operating environments.	ANSP, airport and airline reports; incident and performance data; infrastructure plans.
Tier 3: Stakeholder insight	Add context, implementation experience and emerging concerns.	Structured interviews, surveys, workshops and contributed case studies.
Tier 4: Analytical synthesis	Translate evidence into comparable signals and practical priorities.	Cross-theme analysis, dependency mapping and carefully governed AARI-informed insight.

Evidence rules

- Distinguish confirmed evidence from expert interpretation, emerging signals and unresolved questions.
- Use traceable sources and identify the period, geography and limitations of each dataset.
- Avoid unsupported continental generalisation from isolated examples.
- Do not rank organisations or States where comparable, validated data is unavailable.
- Protect confidential stakeholder information and proprietary VLM methodologies.
- Offer affected stakeholders an opportunity to verify attributed case material before publication.

PRELIMINARY DOES NOT MEAN UNVERIFIED

It means that the direction of enquiry is established while evidence collection, validation and stakeholder engagement remain in progress.

ANALYTICAL FRAME

Resilience as a system capability

AAARO uses a system-of-systems perspective. Aviation resilience is assessed through the interaction of six capability lenses applied across all nine focus areas.

Capability lens	AAARO interpretation
Anticipate	Recognise changing risks, dependencies and weak signals before disruption.
Prepare	Establish governance, resources, procedures, competence and tested contingencies.
Withstand	Maintain essential functions when components, services or assumptions fail.
Respond	Coordinate timely operational, technical and executive action under pressure.
Recover	Restore safe service in a controlled, prioritised and evidence-led manner.
Adapt	Learn from disruption and improve design, policy, investment and behaviour.

Cross-cutting dependency lenses

- Technology and data integrity
- People and organisational capability
- Governance, regulation and accountability
- Infrastructure, supply chains and energy
- Regional coordination and interoperability
- Financial sustainability and investment readiness

The full Outlook will use these lenses to identify where resilience depends on more than one organisation or domain, and where investment or policy action could generate benefits across the aviation ecosystem.

NINE FOCUS AREAS

Focus areas 1-2

01 OPERATIONAL RESILIENCE

PRELIMINARY SIGNAL

Continuity arrangements must move beyond document compliance toward tested, cross-organisational readiness for degraded operations.

Why it matters

Aviation operations depend on tightly coupled services. A disruption affecting surveillance, communications, navigation, power, staffing, data or access control can produce consequences beyond the originating organisation.

Priority questions for the full Outlook

- Which essential services and dependencies create the greatest continuity exposure?
- How consistently are degraded modes, failover arrangements and recovery priorities exercised?
- Where is cross-border or multi-agency coordination required before disruption occurs?

Evidence pathway: *Contingency plans, exercise records, service continuity data, stakeholder interviews and case studies.*

02 CNS/ATM SYSTEMS AND INFRASTRUCTURE

PRELIMINARY SIGNAL

Modernisation choices must balance performance gains with redundancy, integrity, interoperability, maintainability and sovereign operational needs.

Why it matters

CNS/ATM services are foundational to safe and efficient airspace operations. Satellite dependence, legacy integration, spectrum pressures, surveillance trust and lifecycle constraints can create new forms of fragility.

Priority questions for the full Outlook

- Where do single points of failure or common-mode dependencies remain?
- How are GNSS interference, surveillance integrity and communications continuity being managed?
- Do procurement and upgrade programmes adequately address lifecycle support and degraded operations?

Evidence pathway: *CNS/ATM architecture reviews, outage trends, GNSS/RFI evidence, infrastructure plans and ANSP input.*

NINE FOCUS AREAS

Focus areas 3-4

03 AVIATION CYBERSECURITY

PRELIMINARY SIGNAL

Cybersecurity must be integrated with aviation safety, operational continuity and executive governance rather than managed as a stand-alone IT concern.

Why it matters

Digital interconnection expands operational capability but also increases exposure to compromise, disruption and loss of trust. Sector resilience requires clear accountability, information sharing, incident readiness and competent personnel.

Priority questions for the full Outlook

- How are cyber risks translated into operational and safety consequences?
- Are incident management, emergency planning and sector information-sharing arrangements sufficiently mature?
- Where do skills, supplier dependencies or legacy technologies constrain implementation?

Evidence pathway: ICAO cyber pillars, regulator requirements, organisational policies, incident exercises and anonymised maturity evidence.

04 AI AND DIGITAL TRANSFORMATION

PRELIMINARY SIGNAL

Responsible digital transformation depends on governance, data quality, assurance, human oversight and operational readiness - not technology adoption alone.

Why it matters

AI and advanced analytics can support planning, maintenance, safety intelligence and decision-making. In safety-critical environments, benefits must be balanced with accountability, explainability, cyber risk, data governance and human performance.

Priority questions for the full Outlook

- Which use cases create measurable operational value without weakening accountability?
- What assurance and human-oversight mechanisms are required for safety-critical applications?
- Are organisations prepared to govern data quality, suppliers, models and change over time?

Evidence pathway: AI governance standards, documented aviation use cases, organisational policies and expert consultation.

NINE FOCUS AREAS

Focus areas 5-6

05 SAFETY, SECURITY AND TRUST

PRELIMINARY SIGNAL

Trust is becoming an operational requirement shaped jointly by safety performance, physical security, cybersecurity and information integrity.

Why it matters

Traditional boundaries between safety, security and digital risk are increasingly porous. Fragmented ownership can obscure shared dependencies and delay coordinated action.

Priority questions for the full Outlook

- Where do safety, security and cybersecurity responsibilities overlap or leave gaps?
- How is information integrity protected across operational decision chains?
- What governance arrangements support reporting, learning and accountable action?

Evidence pathway: *Safety and security plans, audit and occurrence data, trust-related case studies and governance reviews.*

06 CLIMATE AND INFRASTRUCTURE RESILIENCE

PRELIMINARY SIGNAL

Long-lived aviation infrastructure must be planned for physical climate exposure, energy continuity and sustainable adaptation under constrained investment conditions.

Why it matters

Heat, flooding, storms, water stress and energy instability can affect runways, navigation services, buildings, access routes and workforce availability. Resilience investments require lifecycle and system-level planning.

Priority questions for the full Outlook

- Which assets and services face material climate or energy-continuity exposure?
- How are adaptation requirements included in capital planning and asset management?
- Which interventions deliver both resilience and environmental value?

Evidence pathway: *Climate risk assessments, airport and ANSP asset plans, energy data, infrastructure case studies and adaptation strategies.*

NINE FOCUS AREAS

Focus areas 7-8

07 GOVERNANCE AND POLICY

PRELIMINARY SIGNAL

The gap between strategic ambition and operational resilience is often an implementation, coordination and accountability challenge.

Why it matters

Effective resilience depends on coherent responsibilities across States, regulators, service providers, operators and regional institutions. Fragmentation can slow investment, standardisation and crisis coordination.

Priority questions for the full Outlook

- Are resilience responsibilities explicit, funded and measurable?
- Where would regional harmonisation or shared capability create disproportionate benefit?
- How can policy remain outcome-focused while accommodating different levels of institutional capacity?

Evidence pathway: *Legislation, policy frameworks, implementation plans, regional mechanisms and decision-maker interviews.*

08 CAPACITY DEVELOPMENT

PRELIMINARY SIGNAL

Technical competence, leadership depth, institutional memory and human performance are core infrastructure for resilience.

Why it matters

Technology and procedures cannot compensate indefinitely for shortages in specialist skills, succession planning, training quality or organisational learning. Capacity building must be connected to operating needs and future systems.

Priority questions for the full Outlook

- Which critical roles and competencies present the greatest continuity risks?
- How effectively are training, mentoring, succession and retention linked to modernisation plans?
- Where could shared regional training or communities of practice improve sustainability?

Evidence pathway: *Workforce profiles, training frameworks, human-performance evidence, vacancy trends and stakeholder input.*

NINE FOCUS AREAS

Focus area 9

09 INNOVATION AND EMERGING TECHNOLOGIES

PRELIMINARY SIGNAL

Innovation should be evaluated by its contribution to safe integration, operational value and long-term system resilience.

Why it matters

Drones, advanced air mobility, space-based services, automation and new data ecosystems can expand capability while challenging existing rules, airspace structures and assurance practices.

Priority questions for the full Outlook

- Which technologies are approaching operational relevance in African contexts?
- Are regulatory, technical and institutional capabilities developing at a compatible pace?
- How can experimentation be enabled without transferring unmanaged risk into the operational system?

Evidence pathway: *Regulatory sandboxes, trials, research programmes, technology roadmaps and operational demonstrations.*

What the full AAARO will add

- A structured scan of technologies moving from experimentation toward operational relevance.
- African examples illustrating regulatory, infrastructure and capability readiness.
- A risk-and-opportunity view covering integration, assurance, interoperability and lifecycle sustainability.
- Priority actions for regulators, service providers, operators, research institutions and technology partners.

CROSS-CUTTING PRIORITIES

Five priorities for collective attention

	Priority	What it requires
1	Map critical dependencies	Identify dependencies spanning organisations, infrastructure, data, suppliers, energy and cross-border services.
2	Exercise degraded operations	Test realistic scenarios that require technical, operational and executive decisions rather than relying on document review.
3	Strengthen trusted information	Improve the integrity, availability and exchange of safety, security, cyber and operational information.
4	Link investment to resilience outcomes	Require modernisation and infrastructure programmes to demonstrate continuity, maintainability and lifecycle value.
5	Build regional learning mechanisms	Share verified lessons, practical tools and capacity without exposing sensitive operational information.

PRELIMINARY STRATEGIC SIGNAL

The strongest opportunities are likely to sit at the interfaces between organisations and domains - precisely where responsibility, evidence and investment are often most fragmented.

ACTION AGENDA

Questions for aviation decision-makers

Stakeholder group	Priority question
States and regulators	Are resilience outcomes explicit in policy, oversight and investment decisions? Where is regional coordination essential?
ANSPs	Which CNS/ATM, digital, human and supplier dependencies could undermine essential service continuity?
Airports	How are infrastructure, access, utilities, climate exposure and multi-agency operations integrated into continuity planning?
Airlines and operators	Which system-wide dependencies most affect operational recovery, information trust and network continuity?
Technology and infrastructure partners	How do solutions support interoperability, assurance, maintainability, skills transfer and degraded operations?
Research and training institutions	Which evidence gaps and capability needs require sustained African-led research and professional development?
Investors and development partners	How can funding criteria reward measurable resilience, long-term capability and implementation readiness?

Contribution principles

- Participation should be voluntary, informed and appropriately attributed.
- Sensitive operational information should be anonymised or excluded.
- Contributions should distinguish evidence, experience and opinion.
- Case studies should identify context and limitations, not imply universal applicability.

RESEARCH PROGRAMME

From preliminary signals to the full AAARO 2027

Period	Stage	Principal activities
July-August 2026	Frame and source	Confirm scope; establish source register; issue targeted evidence and contribution requests.
August-September 2026	Collect and engage	Review public evidence; conduct stakeholder interviews; invite case studies and sector perspectives.
October-November 2026	Analyse and validate	Triangulate evidence; test themes; verify attributed material; identify practical priorities.
December 2026	Draft and review	Complete full report; perform technical, editorial, legal/IP and design reviews.
January 2027	Publish and convene	Release the inaugural AAARO 2027 and engage stakeholders around priority actions.

Proposed evidence products

- A traceable source register for all reported claims and indicators.
- A thematic evidence note for each of the nine focus areas.
- A limited number of verified African case studies.
- A stakeholder insight synthesis with transparent participation limitations.
- A practical priority matrix distinguishing immediate, medium-term and structural action.

RESEARCH SAFEGUARD

The full AAARO will not publish proprietary AARI assessment logic, confidential organisational results, source code, non-public datasets or funder-sensitive development material.

SELECTED INSTITUTIONAL ANCHORS

Reference framework

Initial sources informing the preliminary analytical frame

International Civil Aviation Organization. ICAO Strategic Plan 2026-2050: Safe Skies, Sustainable Future. <https://www.icao.int/about-icao/Council/strategic-plan-2026-2050>

International Civil Aviation Organization. Aviation Cybersecurity Strategy and its seven pillars. <https://www.icao.int/aviation-cybersecurity/strategy>

International Civil Aviation Organization. Cybersecurity Action Plan. <https://www.icao.int/aviation-cybersecurity/action-plan>

International Civil Aviation Organization. ICAO Global Cyber Risk Considerations (Doc 10213), unrestricted material. <https://www.icao.int/aviation-cybersecurity/Doc10213>

International Civil Aviation Organization. Safety Reports and State of Global Aviation Safety resources. <https://www.icao.int/safety-reports>

Civil Air Navigation Services Organisation. Global Navigation Satellite System Interference: Jamming and Spoofing. <https://canso.org/publication/global-navigation-satellite-system-interference-jamming-and-spoofing/>

Civil Air Navigation Services Organisation. CANSO Standard of Excellence in Human Performance Management. <https://canso.org/publication/canso-standard-of-excellence-in-human-performance-management-2/>

Civil Air Navigation Services Organisation. Recommended Key Performance Indicators for Measuring ANSP Operational Performance. <https://canso.org/publication/recommended-key-performance-indicators-for-measuring-ansp-operational-performance/>

VLM Aviation Infrastructure Advisory. Annual African Aviation Resilience Outlook webpage and 2027 publication framework. <https://vlmaviation.co.za/annual-african-aviation-resilience-outlook/>

The source register will expand during the research phase to include relevant African Union and AFCAC material, State and regulator publications, ANSP and airport evidence, peer-reviewed research and verified stakeholder contributions.

Accessed: July 2026.

INVITATION TO CONTRIBUTE

Help strengthen the evidence base for AAARO 2027

VLM welcomes carefully scoped contributions from African aviation stakeholders, including public reports, verified case studies, implementation lessons and perspectives relevant to the nine focus areas.

Contribution does not guarantee inclusion. All material will be assessed for relevance, evidence quality, confidentiality and consistency with the independent publication methodology.

FULL INAUGURAL PUBLICATION

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VLM Aviation Infrastructure Advisory (Pty) Ltd

[AAARO publication page](#)

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