FLIGHT SAFETY FOUNDATION

Safety Under Pressure — Resilience, People, and Data in a Scaling System

INSIGHTS FROM FLIGHT SAFETY FOUNDATION'S 2025 FORUMS AND SUMMITS

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INTRODUCTION

Flight Safety Foundation's 2025 events, both in-person and virtual in the form of webinars, brought together regulators, operators, manufacturers, air navigation service providers (ANSPs), airports, and safety professionals from multiple segments of aviation. The year's themes were shaped by a shared operating reality: Growth and operational complexity are accelerating, while the risk environment is broadening to include cyber and navigation interference, workforce constraints, and increasing performance pressure on people and organizations.

This report synthesizes cross-cutting threads across the Foundation's 2025 events. It intentionally does not present an event-by-event summary. Instead, it identifies recurring themes, distills distinctive insights that surfaced across forums, and draws out implications for safety strategy and Flight Safety Foundation programs.

A central takeaway from 2025 is that safety performance is increasingly determined by system properties — culture, capability, information quality, and resilience margins — rather than by any single initiative. Technology is a powerful enabler, but it amplifies the organization that deploys it: Strong culture and governance make technology safer and more effective; weak culture and governance make it brittle or even hazardous.

Flight Safety Foundation 2025 Events Portfolio at a Glance

Flight Safety Foundation's 2025 portfolio spanned multiple segments and regions, enabling cross-fertilization of insights among business aviation, commercial operations, regulators, airports, and ANSPs. The events covered in this synthesis include the following major gatherings, which brought together more than 5,000 participants from more than 120 countries. Those events included:

- **Business Aviation Safety Summit (**BASS) (Charlotte, North Carolina, U.S.) — a focus on business aviation safety and operational resilience, with strong emphasis on communication and human performance.
- **Safety Forum** (Brussels) — a cross-industry safety forum focused on human-centered safety, well-being, and resilience.
- **African Aviation Safety and Operations Summit** (Kigali, Rwanda) — an examination of regional operational and oversight challenges, with a strong runway-safety and implementation focus.
- **Asia Pacific Summit for Aviation Safety** (AP-SAS) (Singapore) — a look at scaling safety under growth and digital transformation, including emerging cyber and global navigation satellite system (GNSS) interference issues.
- **International Aviation Safety Summit** (IASS) (Lisbon, Portugal) — global cross-domain dialogue on systemic risk, resilience, and the safety implications of rapid change.
- **More than a dozen webinars throughout the year.**

Global Aviation Safety Think Tank

In its 2025 convenings, Flight Safety Foundation functioned not simply as an event organizer but also as a global aviation safety think tank in action. Each summit created a structured environment where practitioners — regulators, operators, manufacturers, service providers, researchers, and frontline professionals — could compare realities, test assumptions, and connect "weak signals" across domains that rarely sit at the same table. The value, therefore, was not only in the agenda, but in the expert engagement itself: informed challenge, peer learning, and leadership dialogue that turned individual experiences into shared understanding, practical priorities, and momentum for change that extends well beyond the closing session.

What you will read in this report is the aggregation and synthesis of that collective knowledge — drawn from the expertise of thousands of practitioners who participated, challenged, and contributed to the Foundation's 2025 events and distilled what they learned into the shared threads, insights, and priorities that matter most for advancing safety.

Executive Observations: What 2025 Revealed About the Safety System

- **Culture is being stress-tested by operational pressure**. Managing procedural drift and normalization of deviance requires detecting weak signals early and having safe ways to adapt without improvization.
- **Mental health and well-being moved from a support function to a safety barrier.** The industry increasingly recognizes that resilient performance requires designed recovery capacity — not silent endurance.
- **Safety intelligence — not data volume — is the differentiator.** The challenge is turning many signals into decision-quality insights that change choices in operations, maintenance, training, and oversight.
- **Artificial intelligence (AI) is not optional, but it must be governed.** Discussions in 2025 were pragmatic: Adopt in phases, validate rigorously, and keep humans in the loop when context and accountability matter most.
- **Security threats are also safety threats.** GNSS interference and cyber events are operational hazards, requiring layered resilience, faster reporting, and cross-domain coordination.
- **Persistent risks remain at the top of the pyramid** — runway excursions and incursions, loss of control–in flight (LOC-I) and controlled flight into terrain (CFIT), for example — but turbulence, component failures, and abnormal runway contact are gaining prominence as systemwide risk drivers.
- **Regulators are being asked to evolve from protectors to enablers** — without losing legitimacy — through clearer regulator risk appetite, better stakeholder involvement, and data-informed oversight.
- **Regional capability gaps are widening the urgency for peer learning models, practical implementation support, and targeted capacity building that strengthens systems** — not just requires additional training hours.

The sections that follow expand these observations into actionable insights, grounded in the language and recommendations that surfaced repeatedly across the 2025 events.

1 STRENGTHENING THE CORE: CULTURE, COMMUNICATION, AND SAFETY LEADERSHIP

Culture as an engineered system — observable, measurable, reinforceable

Across 2025 events, culture was reframed from an aspiration into a practical operating system with routines, expectations, behaviors, and reinforcement mechanisms that determine how risk is perceived and managed. A recurring insight was that the system must strengthen its foundations — culture, collaboration, and capability — precisely because technology and operational concepts are evolving quickly.

Safety leadership was repeatedly positioned as the lever that makes culture tangible. The Foundation's "Seven Essential Principles of Aviation Safety Leadership" were discussed as a practical roadmap because they translate values into leadership actions: embedding safety into strategy, clarifying accountability, resourcing competence, creating psychological safety for reporting, and sustaining learning discipline.

Communication as a safety capability — not a 'soft skill'

Communication emerged as a distinctive thread in 2025. Discussions examined not only cockpit phraseology but also briefing quality, cross-functional handoffs, deconfliction of priorities, and how organizations talk about safety under pressure. Several conversations highlighted how inconsistent language, informal shorthand, and unclear escalation pathways can become systemic precursors to drift — especially when teams are decentralized and turnover is high.

Practical examples highlighted the value of deliberate, low-friction routines that keep safety visible between formal meetings. One example was a simple cadence of short check-ins between safety leaders and operational departments to identify weak signals early and close feedback loops quickly.

Operational pressure and SOP drift: Shifting from blame to system design

Standard operating procedure (SOP) drift and normalization of deviance were discussed as emergent properties of pressured systems rather than individual failure modes. When schedules tighten, staffing thins, and complexity rises, work naturally migrates toward shortcuts and local optimizations. The safety question becomes: How quickly can the organization detect migration, understand why it is happening, and restore alignment (through resources, redesign, or deliberate adaptation) before the drift becomes "normal"?

This framing sharpened the link between culture and resilience. A just culture approach is incomplete if it is not paired with visible operational fixes and feedback to the people raising concerns; otherwise, trust erodes and reporting declines.

2 PEOPLE AND PERFORMANCE: MENTAL HEALTH, FATIGUE, INCLUSION, AND SKILLS

From support to safety barrier: Well-being as resilience infrastructure

Across FSF forums in 2025, mental health, well-being, fatigue, and workload management were elevated as safety-critical elements of system resilience. The industry increasingly recognized that human performance is a primary safety mechanism — and, therefore, something the system must protect deliberately.

A particularly consequential insight was the distinction between resilient performance and silent endurance. Silent endurance describes the hazardous zone where people continue to perform under sustained pressure without adequate recovery or support until accumulated strain manifests as impaired judgement, error, or acute crisis. This is a system-design problem: Organizations need explicit strategies to create margin (staffing buffers, realistic schedules, protected rest, workload management, and predictable recovery) rather than relying on personal coping.

Peer support: High impact, but only when governed as a safety control

Peer support programs were consistently discussed as high-impact interventions when they resolve issues early and confidentially. In business aviation discussions, peer-support leaders described experience where roughly three-quarters of cases (about 75 to 80 percent) could be resolved through peer support alone — before issues escalate into medical, operational, or disciplinary pathways.

However, 2025 discussions also warned against program adoption without system fit. Peer support must be trusted, resourced, and integrated into governance, with clear boundaries, privacy protections, qualified peer selection and training, and escalation protocols that preserve safety while minimizing stigma.

Inclusion and workforce sustainability: A safety continuity issue

Workforce constraints appeared across events, and shortages of qualified personnel, competition for skills, and the need for training capacity that keeps pace with growth were all mentioned. Inclusion was presented as a practical safety lever because psychological safety and belonging influence reporting, learning, and retention, especially as younger generations bring different expectations involving well-being and transparency.

Integrating well-being into organizational strategy

Beyond individual interventions, 2025 discussions highlighted organization-level approaches that integrate well-being into strategy and governance. One example was a structured integrated well-being system built as a multi-pillar business strategy alongside safe operations, customer focus, digital transformation, and sustainability — framing well-being as a core capability for resilient performance rather than an auxiliary benefit.

3 FROM DATA TO SAFETY INTELLIGENCE: ANALYTICS, AI, AND LEARNING SYSTEMS

The maturity shift: From dashboards to decisions

Discussions suggested that the data era has matured into a decision era. Many organizations now collect extensive operational data; the differentiator is whether they can convert signals into insight that changes decisions in operations, rostering, maintenance planning, training, and oversight.

Safety intelligence was framed as pattern recognition across complex interactions, not just trends in event rates. This expands the learning lens beyond error to include how front-line teams adapt successfully and how disruptions are contained so resilience mechanisms can be strengthened and scaled.

AI pragmatism: Adopt, but validate and govern

AI and advanced analytics were discussed with pragmatism: The era is already here, and delaying adoption can introduce risk if organizations fall behind in capability. Yet the dominant message was discipline. AI must be implemented in phases, validated against operational reality, and anchored in high-quality data.

A common practice concept was "human plus AI, not human versus AI." Participants emphasized that AI can reduce workload, strengthen detection, and accelerate analysis, but accountability and context remain human responsibilities. Governance frameworks (documentation, monitoring, and change control) were seen as essential to avoid black-box decision-making.

Expanding the signal set: Narratives, language, and communication data

A distinctive insight from 2025 was the value of non-traditional data sources. Applied linguistics was discussed as an underused tool: analyzing language and communication patterns to detect safety-relevant trends that standard taxonomies miss. Similarly, structured narrative analysis was positioned as a way to reveal organizational pressures, training gaps, and procedural ambiguities that are invisible in checkbox reporting.

A systems metaphor that resonated: Complexity and 'entropy'

A systems metaphor that resonated used complexity science: in complex systems, "entropy" tends to increase unless deliberate energy is applied to maintain order. In safety terms, drift and degradation are natural tendencies; sustaining safety requires continuous investment in competence, feedback, and resilience margins.

4 RESILIENCE BY DESIGN: MANAGING COMPLEXITY AND OPERATIONAL PRESSURE

Contingency planning as a system capability

Resilience was repeatedly framed as a design requirement, not just an emergency response posture. Contingency planning was described as comprehensive: It must be based on risk assessment, define required redundancy, identify resources, develop plans, and include training and drills. A simple but powerful observation surfaced: The time to test a contingency plan is not during the crisis.

Complexity and the buffer problem

Growth and complexity were treated as buffer-management challenges. When operational buffers (time, staffing, spare capacity) are reduced, systems become more sensitive to disruption and more prone to drift. Multiple discussions highlighted that sudden instability — last-minute changes, schedule volatility, staffing shortfalls — can amplify risk even if each change appears manageable in isolation.

Ground and runway operations: Where everyday resilience is most visible

Business aviation discussions offered a concrete resilience insight: A large share of aircraft damage is reported to occur on the ground (often cited at around 70 percent), and damage costs can be dramatically higher than other events (reported as up to 100 times more). The implication is that everyday resilience is often decided in routine ground and turnaround operations through communication, disciplined procedures, and training for non-routine situations.

5 SECURITY AS SAFETY: GNSS INTERFERENCE, CYBER RISK, AND HYBRID THREATS

GNSS interference as a mainstream safety hazard

GNSS interference and spoofing were no longer treated as isolated anomalies. Discussions framed interference as increasingly intentional, creating a hybrid threat environment that directly affects civil aviation operations.

The response was consistently framed in two horizons. Near-term: improve reporting, detection, and operational procedures, and strengthen coordination across stakeholders. Longer-term: invest in resilient positioning, navigation, and timing architectures, including terrestrial backups and alternative technologies. Several discussions stressed that security requirements must be treated as safety requirements, paired with more agile mechanisms for reporting and tracking interference patterns.

Cyber resilience as operational capability

Cyber risk was discussed as both technical and human. Practical recommendations focused on implementable steps: securing cloud-based systems, enforcing multi-factor authentication, controlling device-network interactions, and building cyber awareness so frontline personnel can recognize suspicious activity. Layered defenses (including zero-trust concepts) and leadership resourcing were seen as prerequisites for credible cyber readiness.

6 PERSISTENT OPERATIONAL RISKS: RUNWAY, TURBULENCE, MAINTENANCE, AND COMMUNICATION

Persistent top risks remain — and require renewed discipline

Even as new threats gain attention, 2025 reaffirmed that the highest-severity risks remain persistent: CFIT, LOC-I, midair collisions, and runway safety. At the same time, turbulence, system component failures, and abnormal runway contact were elevated as increasingly prominent risk drivers.

Runway safety: The convergence of human factors, procedures, and infrastructure

Runway safety threads were remarkably consistent across regions. They combined fundamentals (weight-and-balance discipline, stable approach criteria, go-around policy) with system challenges such as infrastructure constraints, dynamic hazards like runway construction, and coordination gaps between airlines, airports, and regulators. Recommendations repeatedly called for proactive risk assessment, strengthened runway safety teams, improved runway-awareness and alerting tools, clearer operational approvals, and tighter feedback loops when procedures are not followed.

Turbulence management: A data plus training plus decision-making problem

Turbulence was treated as a synthesis topic: Weather risk intersects with operational decision-making, training, data collection, and passenger/crew injury prevention. Discussions emphasized mapping turbulence-prone regions, strengthening preflight and en route decision-making, and using data-driven analysis to evaluate corrective actions. The broader implication is that turbulence becomes more manageable when treated as an operational system to be learned and improved.

Maintenance and engineering: Earlier detection and stronger feedback loops

Maintenance and engineering risks were increasingly discussed through a predictive and systemic lens. Component failures and abnormal events require earlier detection, trend monitoring, and feedback loops between maintenance, engineering, and operations so that corrective actions occur before risk concentrates.

Communication factors: Under-reported but safety-relevant

Several discussions pointed to communication and language factors as safety-relevant yet under-reported. Standardization of how communication issues are captured, analyzed, and addressed, including through narrative analysis and applied-linguistics approaches, was presented as a meaningful opportunity to improve learning and prevention.

7 GOVERNANCE AND OVERSIGHT: THE EVOLVING REGULATOR/INDUSTRY INTERFACE

From protector to enabler — Without losing legitimacy

Regulators were described as operating in a new environment: Growth, new technologies, and complexity are stretching traditional oversight. A recurring message was that the regulator's role is evolving from being solely a protector to also becoming an enabler of safe innovation while sustaining public trust.

This evolution requires clarity about the state's tolerance for risk. Enabling innovation without undermining safety depends on explicit boundaries, transparent decision-making, and deeper stakeholder involvement in policy development beyond consultation and toward meaningful participation.

National safety plans: Integrating safety programs into operational reality

State safety programs and national aviation safety plan discussions reinforced that success depends on integration into daily operations and that state safety programs should not be treated as standalone compliance artefacts. Fit-for-purpose governance was repeatedly emphasized: Safety management must adapt to operational realities, remain motivated by intrinsic risk awareness, and evolve with the system.

8 FOCUSED REGIONAL PATHWAYS: CAPABILITY GAPS, PEER LEARNING, AND IMPLEMENTATION REALITY

Africa: Practical implementation, shared learning, and targeted capacity building

Africa-focused discussions revealed some realities of implementation: shortages of qualified personnel for accident investigation and surveillance, variability in effective implementation, and the need to develop safety targets into actionable programs. Peer reviews and collaborative safety enhancement groups were presented as pragmatic mechanisms to accelerate learning, strengthen accountability, and avoid duplication.

A notable thread was the need to broaden who is included in safety improvement efforts — such as ground handlers, airport stakeholders, and cross-agency partners — because many operational risks (including runway and ground events) occur at the interfaces between organizations.

Asia Pacific: Scaling safely under rapid growth and digitization

Asia Pacific discussions emphasized scale and future readiness: Traffic growth, constrained airspace, and rapid digitization were described as pressure-testing foundational systems. The region's leadership role was positioned as globally relevant because strategies developed to manage growth, complexity, and new threats will inform other regions' trajectories.

Capacity-building as system-building

Across regions, a consistent lesson was that capacity-building is not just training; it is system-building. It requires political leadership, sustained investment, harmonized expectations, and mechanisms for sharing practical knowledge at the point of need.

9 LEVERAGING 2025 INSIGHTS INTO OPPORTUNITIES TO ADVANCE SAFETY

The 2025 themes underscore and sharpen Flight Safety Foundation's value proposition: independent credibility, the ability to convene across domains and regions, and a proven capability to translate emerging risks into practical guidance, measurable improvement, and sustained collaborative action.

Opportunities emerging from 2025 themes

- **Safety leadership as an operational discipline:** Expand the Seven Essential Principles into toolkits, measurement concepts, and leadership routines that help organizations make culture observable and reinforceable.
- **Well-being integrated into safety management systems** (SMS): Develop practical guidance for incorporating mental health, fatigue, and workload into hazard identification, risk assessment, reporting pathways, and learning processes and pair these with peer support governance templates.
- **Safety intelligence and AI governance:** Convene and publish good practice on data quality, validation of AI-enabled tools, and cross-functional learning loops that connect operations, maintenance, training, and oversight.
- **Resilience by design for modern threats:** Develop playbooks and convenings on GNSS resilience, cyber readiness, and security–safety integration, including layered mitigations and reporting improvements.
- **High-impact persistent risk campaigns:** Continue targeted work on runway safety and turbulence, using aligned action plans and practical implementation support for airlines, airports, and ANSPs.
- **Regional peer learning models:** Support peer-review mechanisms and collaborative safety enhancement groups that accelerate capability-building and share operational best practices at scale.

From Dialogue to Direction: Convening Global Expertise

A strategic implication for Flight Safety Foundation platforms is to connect threads that surfaced separately: well-being with operational pressure; AI adoption with governance and trust; runway and turbulence with infrastructure and coordination; and security threats with operational procedures and safety management. Framing these as integrated problems mirrors how risk actually behaves in complex systems.

10 AWARDS PRESENTED IN 2025: REINFORCING THE VALUES BEHIND THE YEAR'S THEMES

Across 2025, the Foundation's awards did more than recognize achievement — they signaled the behaviors the global system needs most right now. In a year when discussions repeatedly returned to culture, collaboration, and capability as the foundations for safety at scale, the awards program helped translate those themes into visible, concrete examples of leadership in action.

Culture (leadership that shapes norms, not just outcomes). The 2025 Jerome Lederer Safety Leadership Medal recognized Yannick Malinge, senior vice president and chief product safety officer with Airbus, for advancing safety culture, setting higher safety benchmarks, and mentoring the next generation of safety leaders — an explicit reinforcement that culture is built through sustained leadership choices and investment in people.

Capability (innovation that changes the safety baseline). The 2025 David Morrison Innovation Award recognized Ratan Khatwa, executive technical fellow, The Boeing Company and (formerly a senior chief engineer at Honeywell), for contributions to flight deck technologies and safety systems (e.g., enhanced ground-proximity warning systems, synthetic vision, runway safety alerting). In the context of 2025's themes, this recognition reinforces a simple point: "Capability" is not abstract — it includes the engineered, certified, and adopted tools and processes that make safe performance more repeatable under real-world pressure.

Collaboration and Just Culture (system performance depends on trust). The 2025 Gloria Heath Trophy honored Milena Bowman, executive manager of airspace, systems, and procedures, EUROCONTROL Maastricht Upper Area Control Centre (MUAC), for notable achievements in civil aviation, including advancing just culture across Europe. In a year when themes consistently pointed to the need for open reporting, learning, and shared accountability, this award underscores that collaboration at scale requires psychologically safe systems, especially across organizational and national boundaries.

Sustaining the pipeline (capability is also competence). The 2025 Richard Crane Award recognized Embry-Riddle Aeronautical University for decades of leadership in aviation and aerospace higher education. As 2025 conversations highlighted workforce pressures and the need to scale safely, the award affirms that the next generation of safety performance rests on the strength of the talent pipeline in technical competence, operational judgment, and safety leadership capacity.

Business aviation leadership (raising the bar in every segment). The 2025 Business Aviation Meritorious Service Award recognized Charlie Precourt of Citation Jet Pilots and a former shuttle commander, reinforcing that the same values — professionalism, disciplined learning, and community-driven improvement — must be advanced across all operating contexts, not only in commercial air transport.

Why this matters for the report's 2025 narrative: Taken together, the 2025 awards align with the year's core message: Safety progress is built when culture is led, collaboration is enabled, and capability is strengthened through innovations that stick, institutions that teach, and leaders who make trust and learning non-negotiable.

THE WAY FORWARD

Across the Foundation's 2025 events, the safety conversation converged on a clear proposition: Aviation's challenge is not to choose between culture and technology, or between compliance and innovation. It is to build systems that learn faster than the rate of change.

The year's insights point to a practical agenda for 2026: Strengthen leadership behaviors that make culture tangible; protect the human foundation of resilience through integrated well-being and fatigue/workload management; modernize safety intelligence with disciplined use of data and AI; treat GNSS and cyber threats as safety-critical and build layered resilience; renew focus on runway, turbulence, and maintenance risks with high-impact interventions; and expand collaborative mechanisms that help regions and organizations learn from each other without waiting for accidents.

Most importantly, 2025 reinforced that safety remains a collective enterprise. Moving forward, the Foundation will use its convening power, practical tools, and independent credibility to translate these insights into shared priorities, actionable guidance, and durable, measurable improvements across the global aviation system.