

Barrier Maturity.

Runway Excursion Prevention

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Rotas de Passageiro

BRAZIL

67

domestic
destinations

CHILE

17

domestic
destinations

COLOMBIA

17

domestic
destinations

ECUADOR

7

domestic
destinations

PERU

19

domestic
destinations

5 countries · 127 destinations in the region — plus the international destinations we serve on other continents

— Rotas internacionais operadas pela LATAM Airlines
..... Rotas domésticas operadas pela LATAM Airlines



Dispatch landing distance

The classic "60% rule"

Published 31 December 1964, effective 1965. It requires that, at dispatch, the aircraft's projected arrival weight must allow a full-stop landing within 60% of the effective runway length on a dry runway.

A wet-runway factor requires at least 115% of the dry dispatch distance when wet or slippery conditions are forecast.

FAR 121.195(b), (d) · EASA CAT.POL.A.230 / .235

60+ years of maturity

60%

Dry

×1.67 certified LD

115%

of Dry RLD

×1.92 certified LD

Relative to unfactored certified landing distance from 50 ft, dry, no reverse credit.



Stabilized approach criteria

With a mandatory go-around policy

Formalized in the late 1990s / early 2000s by the Flight Safety Foundation (FSF), through the ALAR Task Force (Approach-and-Landing Accident Reduction)

25+ years of maturity

4.9 UA

per 10.000 Legs

59.7%

With go-around



Flight Data Monitoring

FDM/FOQA

It became a global requirement in the mid-2000s: the FAA published the FOQA framework (AC 120-82) in 2004, and ICAO Annex 6 made a flight data analysis programme mandatory from 1 January 2005

20+ years of maturity

96.5%

Data recovery

Runway excursion precursors we

Short Landing

Deep Landing

monitor
Average Landing distance

Load Factor During Landing

Barriers



ANAC Portaria 9.249/2022

- ROPS / ROAAS (Runway Overrun Awareness and Alerting System) and Brake-to-Vacate
- Tire and brake condition, nosewheel steering
- Accurate onboard performance data (OPT/EFB)
- Friction and macrotexture surveys, "slippery when wet" NOTAM
- Timely dissemination via ATIS / NOTAM / SNOWTAM
- Contaminant removal (snow/ice/water clearing), drainage and grooving
- ATC / ANSP
- Runway-in-use selection (into-wind, longest, best condition)
- Accurate, timely wind and windshear information
- Relay of runway condition to crews
- Approach spacing that supports stabilization — no pressure to expedite
- Aerodrome / infrastructure (preventive)
- Runway grooving, transverse slope and drainage, maintained macrotexture
- Markings, lighting, PAPI, centerline lighting
- Adequate declared distances/length and minimum runway width
- Obstacle-free approach surfaces
- Meteorology / dispatch / planning
- Weather forecasting and monitoring (crosswind, tailwind, windshear, heavy rain)
- Windshear / low-level windshear detection systems
- Dispatch runway/alternate/fuel and performance planning with margins
- Recovery / mitigation barriers (right side)
- RESA — Runway End Safety Area (min. 90 m; 240 m recommended)
- EMAS — Engineered Materials Arresting System
- Runway strip / cleared and graded area (for lateral veer-off)
- Frangible structures and obstacle-free zone; removal of hazards beyond the runway (ditches, roads, poles, embankments, water)
- Aircraft crashworthiness, landing-gear fuse pins, fuel-system protection, fire suppression
- ARFF / rescue-and-firefighting readiness and positioning



In-flight Landing Distance

Southwest 1248 overrun at Chicago Midway on 8 December 2005

- Aug 2006 — FAA SAFO 06012 — time-of-arrival landing performance assessment + 15% margin
- 2008 — FAA charts the TALPA ARC
- 1 Oct 2016 — US operational rollout — RCAM, RwyCC, FICON NOTAMs (SAFO 16009)
- 4 Nov 2021 — ICAO GRF global applicability — RCAM/RwyCC become the world standard

5

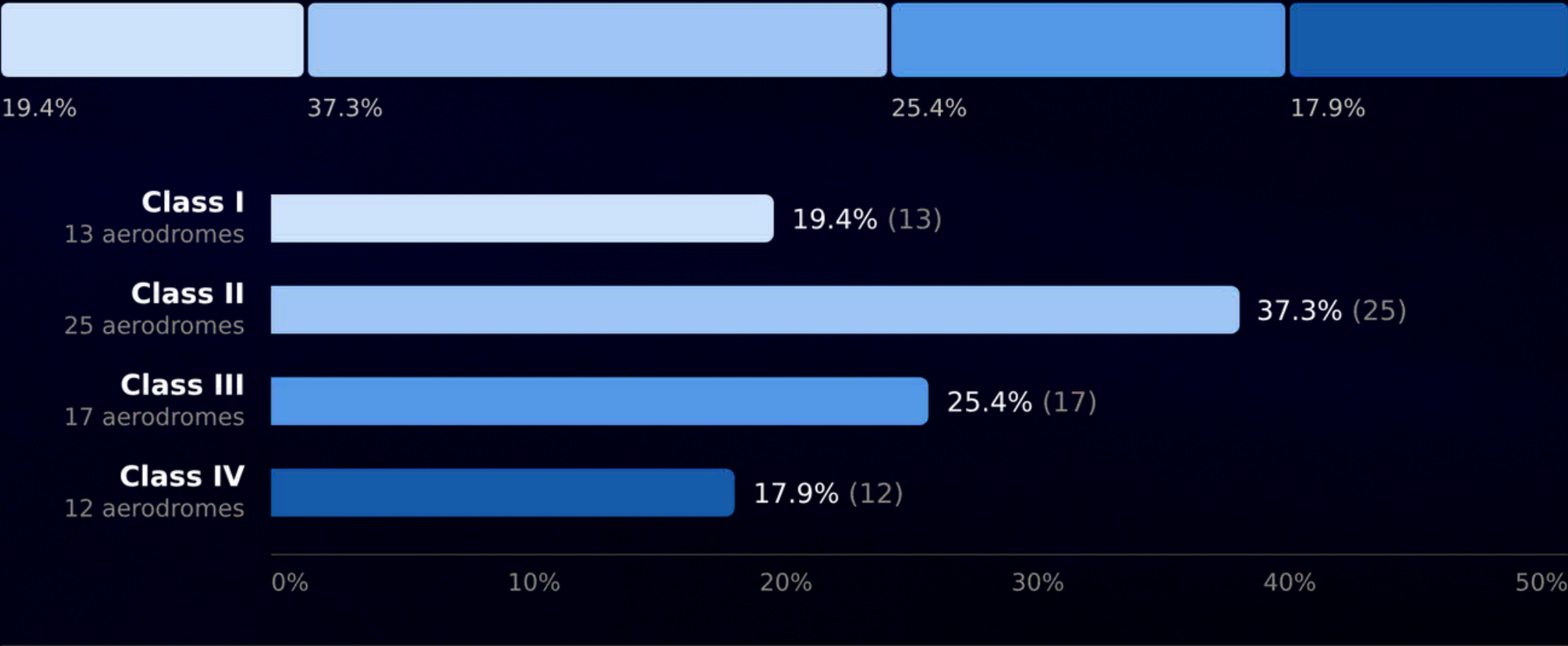
years of maturity

Brazilian scenario

Aerodromes by class — RBAC No. 153

Percentage breakdown of the aerodromes surveyed. Criterion: Section 153.7(b)(2) — average passengers processed over the 3 preceding years (2023-2025).

67 distinct aerodromes
(75 runways)

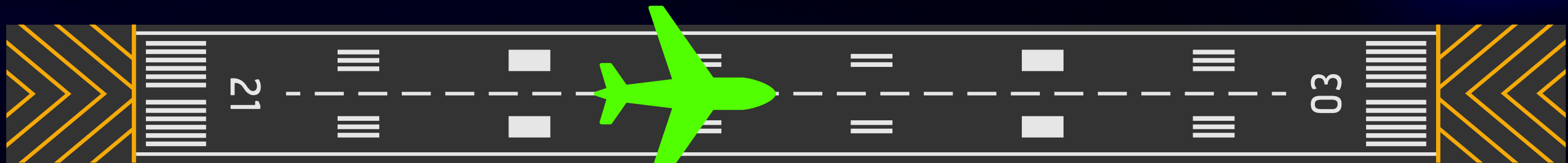


17.9%
Mandatory RCR

A hypothetical scenario



- Dispatch landing distance ✓
- NOTAMs ✓
- METAR/TAFs (NO RCR) ✓
- In-flight Landing Distance (RCAM WET) ✓
- Stabilized approach ✓



Braking action poor on the second third of the runway 21



Pilot report Analysis

Braking reports — key indicators

Monitoring panel for reports received and analysed.

588

Reports analysed

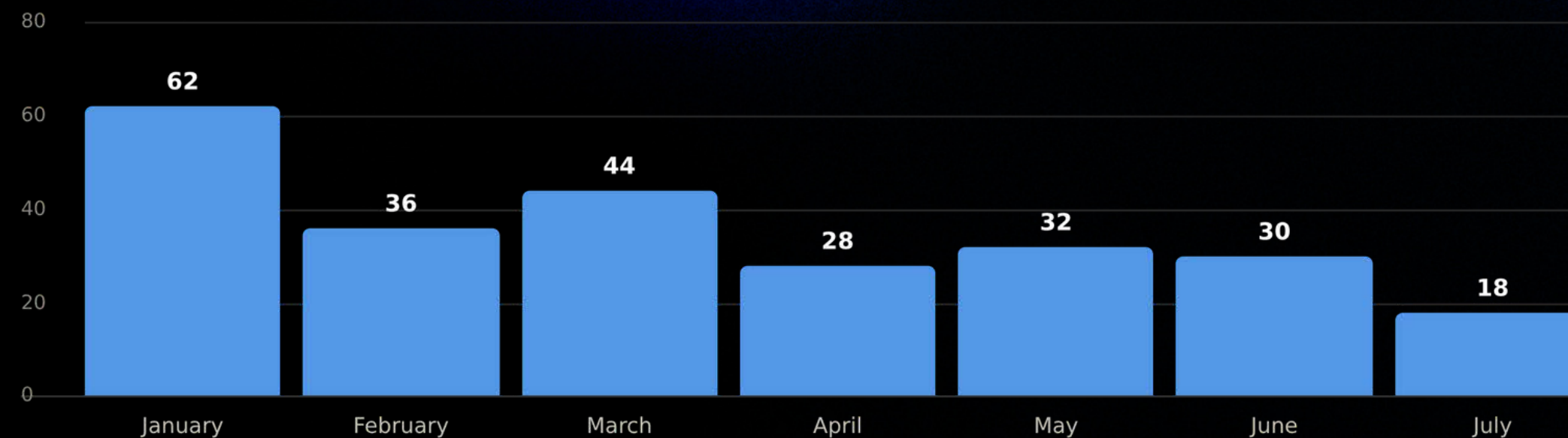
351

Anti-skid activations
59.7% of reports analysed

52%

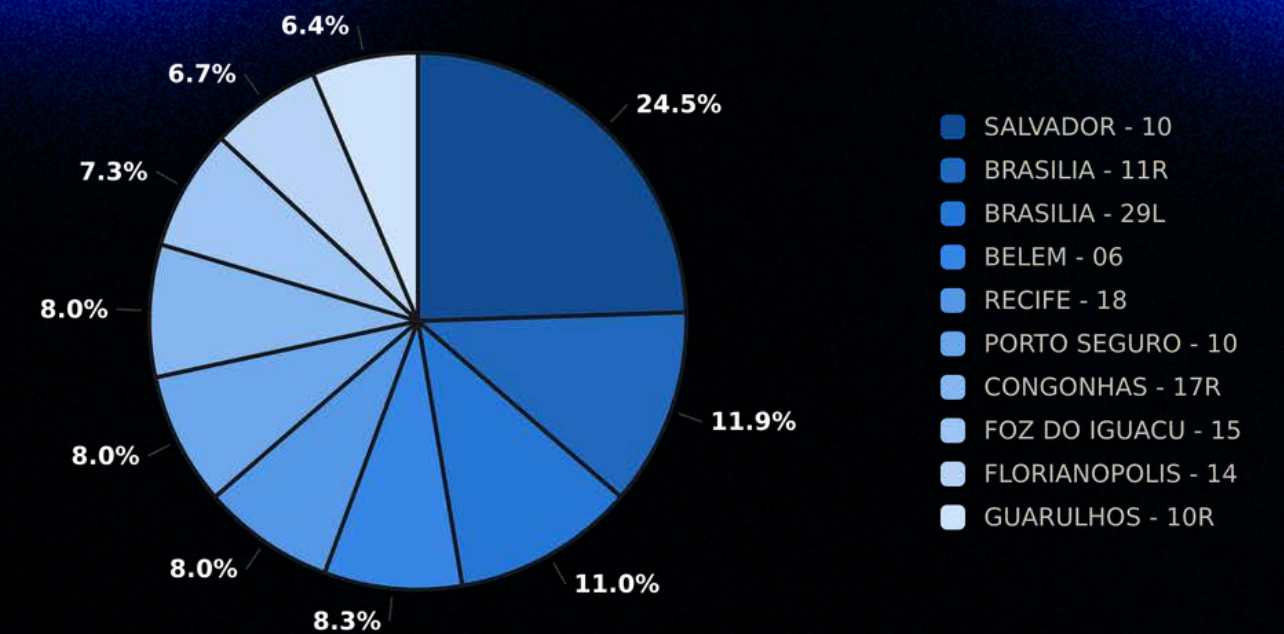
Confirmed occurrences

Valid reports received and analysed per month

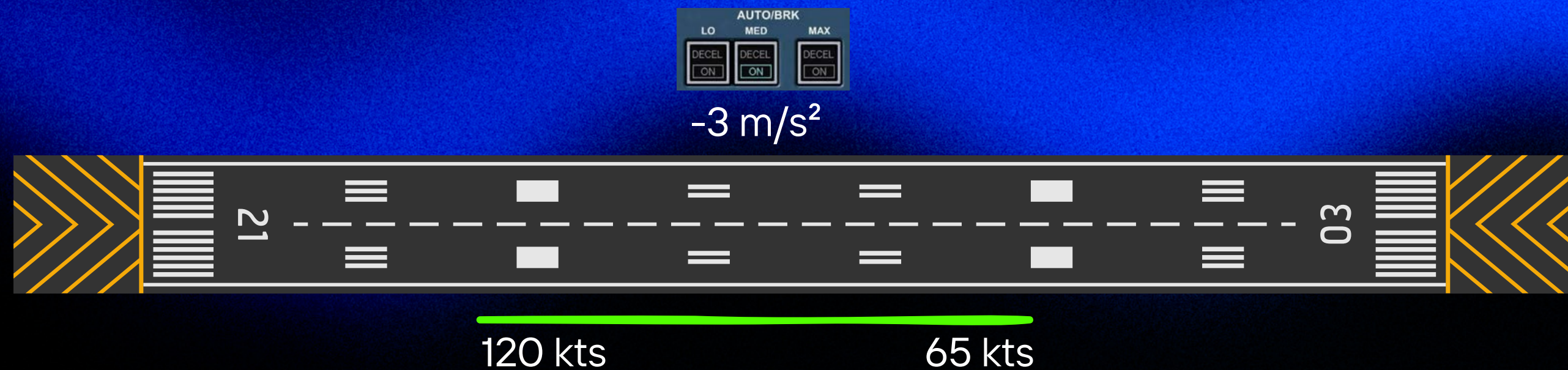


Total for the period: **250** Monthly average: **35.7** Peak: **January (62)** · Low: **July (18)**

Most reported airports / runways



Decel Loss Methodology

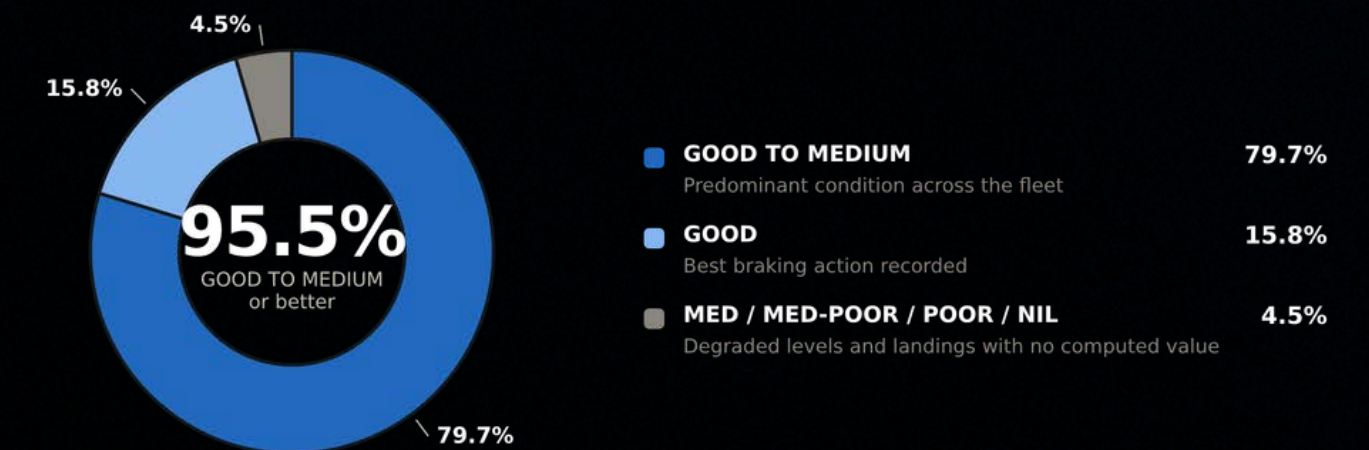


Average decel
Anti-skid activation



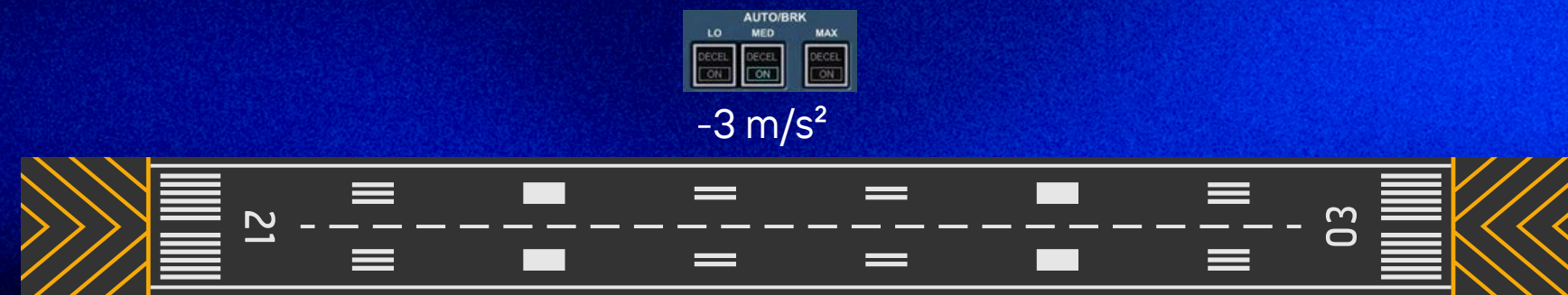
BACF — computed braking action

Braking action derived from the aircraft during the landing roll (Airbus BACF), by share of landings.





Decel Loss Metodology



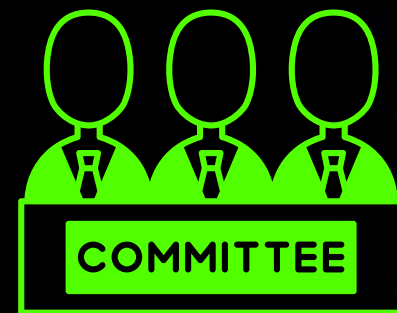
120 kts 65 kts

Average decel
Anti-skid activation

-10%
2,7m/s²

-20%
2,4m/s²

-30%
2,1m/s²



Decision

75

Runways

0

Slippery When Wet
NOTAM

18

Slippery When Wet
LATAM

We have a baby in our hands

The matrix is global — the practice still carries a winter heritage. What must be tropicalised is not *what* we assess, but *how* and *when*.

3 years of aerodrome operator obligation to report — RBAC 153 §153.133(d), in force 2 May 2023. Class IV only	> 3 mm Standing water already means RWYCC 2 — MEDIUM TO POOR . Water is in the matrix	18 of 75 runways where our data and the published picture disagree — all restricted in our operation today
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- FOR AERODROMES**
Make the weather trigger real.
Heavy rain changes the runway in ten minutes. Eight hours of RCR validity is a ceiling, not a service level — resource the trigger.
 - FOR AERODROMES**
Attack “slippery wet” at the source.
Macrotexture, grooving and rubber removal decide whether a wet runway is a 5 or a 3.
 - FOR REGULATORS**
Build the standard that qualifies the aircraft as a sensor.
Aircraft-derived braking data needs an agreed qualification — accuracy, validation, governance — so it can formally feed a more precise assessment.
 - FOR OPERATORS**
Close the loop with ATC — not only with the company.
The crew's perception has power in one direction only: the one that protects.
- FROM LATAM — OUR COMMITMENT**
We will bring this data to this table.
Our decel-loss findings — available to this group, and offered individually to each aerodrome, about its own runways.

AERODROMES watch contamination — attack the causes of slippery when wet	REGULATORS evaluate new technologies and methods to improve the process	CREWS report perceptions to ATC and to the company
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Alone, none of the three protects the operation. **Together, they turn reactive safety into preventive safety.**