Examining Unstable Approaches - Risk Mitigating Efforts

Unstable Approach - Safety Analysis Project Team

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Report on the status and recommendations to improve the aviation industry Unstable Approach performance

Contents

Acknowledgment

We would like to acknowledge the following organisations that have actively contributed to this Unstable Approach Analysis Project

IATA Airline Members

- Gol Airlines,
- Cathay Pacific,
- Air Canada,
- Fedex,
- Japan Airlines,
- Cargolux
- Qatar Airways

Manufactures

- ATR
- Boeing
- Embraer
- Honeywell

Organizations, Associations and Air Navigation Service Providers

- Civil Air Navigation Services Organization (CANSO),
- International Federation of Air Line Pilots' Associations (IFALPA),
- International Federation of Air Traffic Controllers' Associations (IFATCA),
- International Civil Aviation Organization (ICAO),
- Commercial Aviation Safety Team (CAST),
- World Meteorological Organization (WMO),

Executive Summary

Approach and landing procedures are some of the most complex in aircraft operations. The approach and landing phases of flight are critical functions to land an aircraft safely, with a stable approach being a key feature to a safe landing. IATA's Accident Data Exchange Database (ADX) indicates that Unstable Approach (UA) is a contributing factor in 26% of approach and landing accidents between 2016-2020.

The reduction of UA is an ongoing objective of the aviation industry, and operators have strict criteria that must be met for pilots to continue an approach to land. These criteria are based on a series of 'gates' that normally prescribe speed, aircraft configuration, rate of descent, power settings and the correct lateral and vertical path. If these criteria are not met at a certain point, an approach must be discontinued, and the execution of a go-around is mandatory.

In 2017, IATA in collaboration with CANSO, IFALPA and IFATCA produced the 3rd edition of the Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices. The purpose of this guidance is to raise awareness of the elements that contribute to UA, as well as to state some proven mitigation strategies. The guidance emphasizes the importance of pilots, air traffic controllers and airport staff working together along with regulators, training organisations and international associations to agree on measures and procedures to reduce unstable approaches.

In 2020, during the downturn in air transport activity, an analysis of flight operations data revealed a substantial increase in the proportion of unstable approaches. UA was cited as a contributing factor in 29% of all accidents (10 accidents) that happened in that year. At the time IATA alerted the industry of the increase through the issuance of an IATA Operational Notice which recommended operators review their own flight data and promoted the implementation of recommendations within the 3rd edition of the Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices document, among others.

UA is recognized as a precursor of Runway Excursion accidents. However, a deeper analysis of IATA ADX accident data shows UAs are one of the most common contributing factors to many other accidents occurring on approach and landing including Controlled Flight into Terrain (CFIT), Hard Landings, Loss of Control in Flight (LOC-I), and Tail Strikes. This realization, coupled with the identified increase of UA, gave rise to this project.

In an ongoing effort to help the industry implement the most current best practices an Unstable Approach Analysis Project was launched, led by IATA and CANSO, with the participation of IATA members, manufactures, and industry safety partners. The Project Team had a broad expertise in safety, training, human performance, engineers and pilots. Following several months of meetings and discussions, the Team convened a hybrid meeting in Montreal in 2021. A key factor in the successful completion of the first phase of the project was the collaboration of all stakeholders, each with its own expertise.

The Project Team used failure modes and effects analysis (FMEA) method to perform safety risk assessments and evaluate the effectiveness of current industry practices that have been implemented to reduce the UA rate. The project produced key pieces of information:

- Identified issues that can significantly influence the probability of UAs

- Agreed recommendations to enhance stable approaches; all stakeholders that contributed to this project are committed to enhancing stable approaches by advocating the implementation of the recommendations

- Reviewed the results of the survey which was conducted to investigate the barriers and enablers in the implementation of the 3rd edition of the IATA, CANSO, IFALPA and IFATCA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices

- The formation of the Unstable Approach Development and Implementation Team to manage the effective development and adoption of the recommendations mentioned in this report

This document contains only Part I of the project, which includes recommendations addressing:

- Unstable Approach Development and Implementation Team, (Part II)
    - A roadmap the outlines the goals of Unstable Approach Development and Implementation Team

- Aircraft Operators

- Air Navigation Service Providers (ANSPs)

- State/Civil Aviation Authorities (CAAs)

Scope

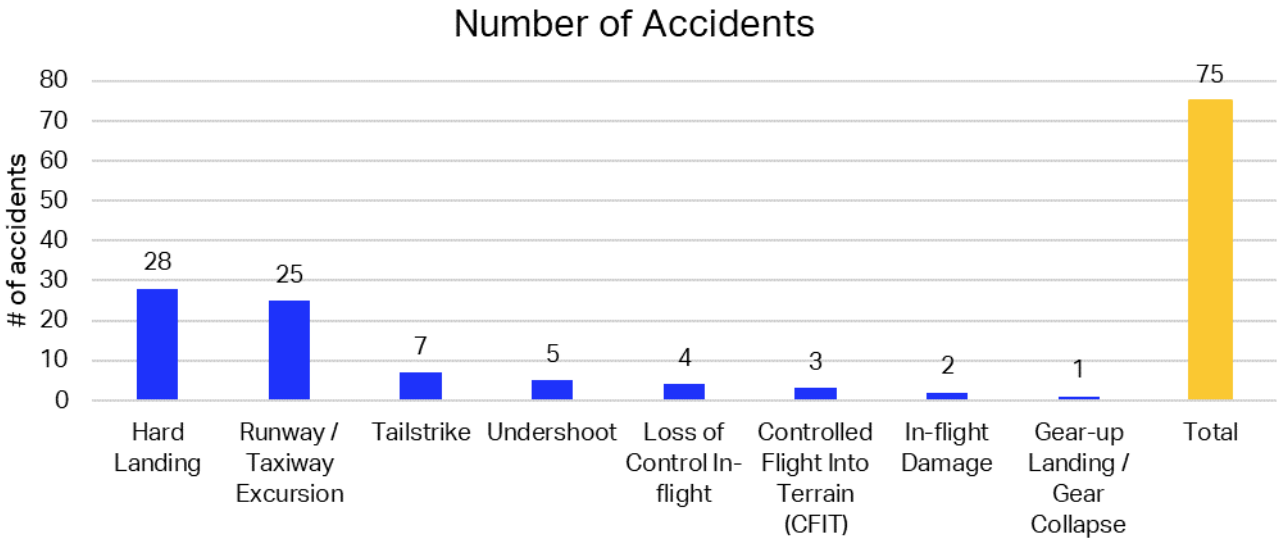
The Unstable Approach Analysis Project is implemented in two different phases. The first phase was developed in collaboration with key stakeholders to evaluate the effectiveness of current industry practices that have been implemented to reduce the UA rate; provide recommendations to enhance their effectiveness; and determine where new recommendations could be developed to fill identified gaps.

The context, safety aspects and risks of UAs were analyzed and characterized by the project team. The Team agreed to address five different categories and perform a safety risk assessment (SRA) for each of those categories. Each team member was assigned to one of the categories according to his/her expertise. The five SRAs and the Team allocation are listed in Appendix "A" to this report.

Due to the complexity of this project, it was decided that this project will be achievable in a phased implementation. With its second phase involving the creation of an Unstable Approach Development and Implementation Team" to manage the effective development and adoption of the recommendations mentioned in this report.

Problem Statement

Every year, millions of landings are concluded safely following a stable approach. An UA, however, significantly decreases the likelihood of a safe landing and leads to an increased risk of a serious incident or accident. Failure to maintain a stable approach could result in a landing that is too fast or too far down the runway, resulting in a hard landing, runway excursion, loss of control, or collision with terrain. Accident performance reported to IATA ADX from 2011 through 2020 indicates 14% of accidents that include runway excursions, hard landings, tail strikes, and other high impact events cited Unstable Approaches as a contributing factor. Figure 1 illustrated the 2011-2020 accidents with UAs as a contributing factor (Undesired Aircraft State).



This project identified issues that can significantly influence the possibility of UAs, these issues are listed in no particular order:

- Variations were noted across the industry in the implementation of Stable Approach Standard Operating Procedures (SOP) as recommended by Aircraft Manufacturers.

- Pilot deviating from the airline SOP and industry best practices for stabilized approach criteria, as well as missed approaches and go-arounds, from pilots.

- Lack of an industry accepted definition of "high risk" Unstabilized Approaches, that might help operators focus activities to achieve effective improvements in the UA rate.

- Lack of participation in industry safety information sharing programs, with local and regional safety groups, could produce systematic industry improvements in UA rates.

- Wider use of the 3rd edition of the IATA, CANSO, IFALPA and IFATCA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices, and other industry documents, is of paramount importance.

- Lack of collaboration, cooperation, transparency, and communication between all participants, including the operators, manufacturers, state regulators, training organizations, Air Navigation Service Providers (ANSP), Air Traffic Control Officers (ATCOs) and, of course, pilots.

- Lack of overcoming barriers to creating a positive safety culture that includes lack of leadership and commitments and ineffective safety incident reporting system. Lack of overcoming barriers to effective Crew resource management (CRM) skills, that includes lack of communication, teamwork, decision making, monitoring, assertiveness, awareness.

Based on the issues identified by the project experts, the following options were considered by the group to enhanced and implement safety measures. They were evaluated based on their effectiveness, cost, implementation time, and efficiency. As a result, many were discarded, and the listed below are the ones chosen by the project team. They are listed in no particular order of importance:

- Improve crew resource management behavior. If CRM is not used and continuously fostered, there is a risk that flight crew will be unprepared to avoid or mitigate errors encountered during flight. Enhancing CRM, through training programs for pilots aiming at improving teamwork, awareness, and decision making, plays a role in decreasing the number of UAs.

- Strengthen positive safety culture within organisations, promoting a non-punitive approach to support increased reporting to learn from occurrences.

- In order to improve the industry UA performance, it is important to fully understand issues the frontline personnel face, by collecting and investigating incident information with the sole purpose of improving safety. Improve/implement national regulations to protect safety information and its sources. Measure implementation of information sharing regulations in the USOAP audit and rank countries accordingly. Propose to ICAO to highlight safety information protections in their USOAP reports to countries.

- Develop an industry standard for Risk Classification of Unstable Approaches ("high risk")

- Validate consistency in the implementation of Stable Approach SOP by airlines, in accordance with the Aircraft Manufacturers recommendations.

- Promote the importance of establishing and actively participating in safety information sharing programs program (ex. EASA - Data for Safety (D4S), FAA - ASIAS, IATA – Flight Data Exchange (FDX), Asia Pacific RASG - AP Share).

- Sharing information and collaborating with industry are the foundation for reducing risk of UAs. Without the growth of safety information exchange, and without wide participation in safety groups, the ability to assess and manage risk is limited.

- Promote and update the 3rd edition of the IATA, CANSO, IFALPA and IFATCA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices, and other industry documents, is of paramount importance.

Reinforce criticality for pilots to comply with SOP stabilized approach criteria, as well as missed approaches and go-arounds, due to the dangers of an UA.

Project Methodology

The Unstable Approach Analysis Project Team was created by IATA and executed by key stakeholders to conduct a study on unstable approaches. The basis for much of the following mainly comes from reviewing existing data sources and guidance materials, performing five Safety Risk Assessments (SRAs), and conducting a survey to gauge the state of the industry and the effectiveness of current industry UA strategies, policies, training, and communication efforts.

The UA Analysis Project Team invested significant effort to achieve a broad consensus as the basis for preparation of this report. Key aspects of achieving that consensus were to

- establish a team of safety experts from IATA members, OEMs, international aviation organizations and IATA

- compile and review existing data sources and guidance materials

- perform safety risk assessments (full reports found in Appendix "A")

- conducting and reviewing a survey to investigate the barriers and enablers in the implementation of its guidance material on IATA, CANSO, IFALPA and IFATCA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd Edition).

- Collate and aggregate the results of the teams' discussions, SRAs, surveys, and all activities related to this project in order to publish this report with the recommendations for industry corrective action, and future work required.

To perform the SRAs, Failure Mode and Effect Analysis (FMEA) was used to analyze unstable approaches risks by listing the potential failures through analysis and collective discussions. This method was used to help identify hazards according to the frequency and the consequence to UAs. The goal is to take steps to minimize or eliminate each potential hazards by documenting existing actions and list possible future safety enhancements.

The UA team decided to split the SRA work into five distinct subgroups in order to fully analyze specific topics surrounding UAs. Every subgroup was populated by key stakeholders according to their specific knowledge and expertise. Training, however, was incorporated into each of the following subgroups.

1) Safety Management

2) Human Factors

3) Pilot and ATC interface

4) Energy Management

5) Go-arounds

The second phase of this project will entail the creation of "Unstable Approach Development and Implementation Team" to manage the effective development and adoption of the recommendations mentioned in this report through an implementation Road Map.

Discussion

UA significantly increases the risk of accidents during the approach and landing phase of flight. Accident data, from ADX, for 2020 and the preceding five years show that UA is a factor in several accidents:

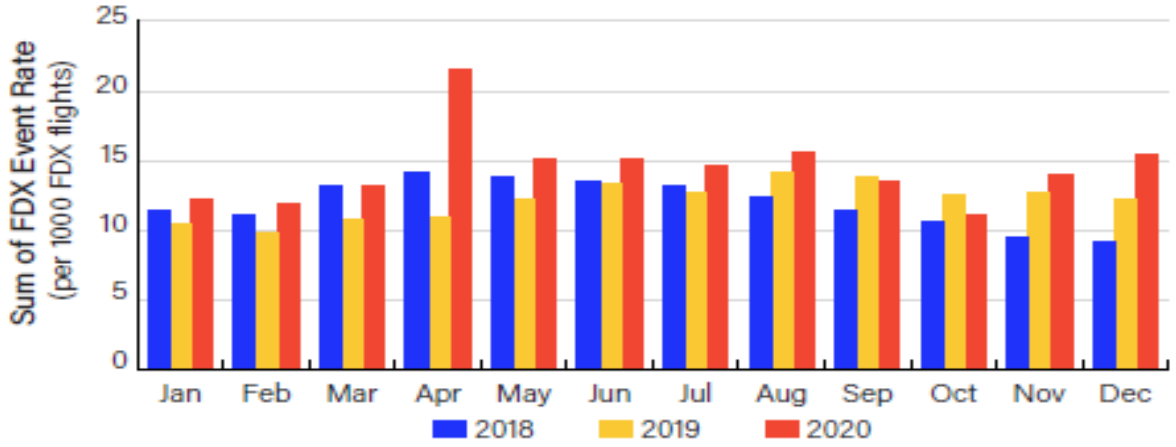
End State	2020	2016-2020	UAS Unstable Approach	UAS Continued Landing after Unstable Approach	Error Failure to G/A after Destabilization on Approach
Runway / Taxiway Excursion	9	70	33% (14)	37% (14)	47% (14)
Hard Landing	7	28	36% (15)	34% (13)	30% (9)
Tail Strike	2	21	12% (5)	11% (4)	6% (2)
Undershoot	2	8	10% (4)	11% (4)	6% (2)
LOC-I	0	19	2% (1)	3% (1)	3% (1)
In-Flight Damage	5	34	2% (1)	3% (1)	3% (1)
Gear-Up Landing / Gear Collapse	6	36	2% (1)	-	-
CFIT	1	5	-	-	-
MAC	0	0	-	-	-
Ground Damage	3	22	-	-	-
Off-Airport Landing / Ditching	0	1	-	-	-
Runway Collision	2	7	-	-	-

Looking at data from the last five years (2016-2020), we can see that UA is a contributing factor in the following types of accident end states:

- Runway / Taxiway Excursion (33%)
- Hard Landing (36%)
- Tail strike (12%)
- Undershoot (10%)
- LOC-I (2%)
- In-flight Damage (2%)

- Gear-up Landing / Gear Collapse (2%)

Furthermore, the risks of UA during 2020 continue, according to the Flight Data Exchange (FDX). The data shows, when comparing unstable events on a monthly basis in 2020 vs. 2019 and 2018, it was apparent that the unstable approach rate increased sharply in April 2020 and returned to acceptable levels until November and December when a new upward trend is evident.



Unstable Approach Trend Rate – Global

Globally, the main contributing factors for UA include, but are not limited to, the following:

1. Adverse weather (e.g., strong or gusty winds, wind shear, turbulence).
2. Pressure on ATC to maximize number of movements, that in turn instruct pilots to maintain high speeds and/or reduce separation with other traffic.
3. Late change of runway.
4. Speed restriction inappropriate to the type of aircraft and/or to the weather conditions prevailing at the airport (e.g., low ceiling, poor visibility, tailwind at altitude).
5. Commercial pressure to maintain schedule.
6. Loss of situational awareness.
7. Flight crew fatigue.
8. Poor visibility and visual illusions.
9. Lack of monitoring by pilots, whether Pilot Flying (PF) and Pilot Monitoring (PM).

Most airlines and other aviation organizations specify minimum acceptable criteria for the continuation of an approach to land. These criteria are detailed in the IATA, CANSO, IFATCA and IFALPA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd Edition), which also makes reference to the Flight Safety Foundation (FSF) Approach-and-Landing Accident Reduction (ALAR) Briefing Note 7-1, which suggests that "all flights must be stabilized by 1,000 feet above airport elevation in Instrument Meteorological Conditions (IMC) and 500 feet above airport elevation in Visual Meteorological Conditions (VMC)".

Different industry study revealed that variations in required stabilization altitudes between operators, between approach types (precision/non-precision) and between meteorological conditions (IMC/VMC) could be a cause for concern and potential confusion. For example, some industry guidance recommends that approaches in IMC must be stabilized by 1,000 feet, and in VMC by 500 feet, for precision, non-precision, and unguided approaches alike, while on a circling approach manoeuvring is acceptable down to 300 feet[1].

Some operators also specify aircraft status at a 'should' gate ahead of the 'must' gate envisaged by the FSF ALAR document. This is typically 500 feet above the 'must' gate; for example, a 'should' gate at 1,000 ft. above ground level (AGL) followed by a 'must' gate at 500 ft. AGL. Failure to satisfy the former requires that corrective action be feasible and taken, whereas failure to satisfy the latter requires a go-around. The industry stable approach criteria can be found at Appendix "B" to this report.

The Policies and SOP discussed were found to be in alignment with the recommendations of Aircraft Manufacturers, regulators and the most current industry best practices and guidance material published, such as the 2021 Global Action Plan for the Prevention of Runway Excursions (GAPPRE).

[1] **IATA, CANSO, IFALPA, IFATCA, Unstable Approaches: Risk mitigation policies, procedures and best practices – 2nd Edition**

Survey Results: Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd edition)

Survey Scope

IATA in collaboration with IFALPA, IFATCA and CANSO launched a survey to investigate the barriers and enablers in the implementation of its guidance material on Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd Edition).

Survey Methodology and Information collected

A survey was developed to understand the barriers and enablers in the implementation of guidance material recommendations. These included two parts: one assessing airline managers' and pilots' perceptions, beliefs, and experiences regarding the implementation of the guidance material, stable approach policies and training as well assessing awareness of factors which can contribute to an unstable approach and how these are managed at their airlines. The second part assessing ANSP and ATCO perceptions of the issue. To fully understand the dynamics of UA across the industry, the results of the pilots were compared with those of the ATCO, where and when applicable.

The two parts mentioned above were further divided into two separate groups:

- Those who were familiar with the guidance material,
- And those who were not familiar with the guidance material.

In order to validate and correlate answers, demographic compositions were analyzed. The data collected included respondents' position (Captain, First Officer, Air Traffic Control Officer, etc.), geographical location, propulsion type, number of flight legs, operation type (passenger, cargo, or both).

Figure 1 provides the identification of the respondents' position. A total of 1,140 participants responded to this question; 86% (1,042) of which are Captains and First Officers. 7% (80) of the respondents were either ATCO or ANSP safety personnel.

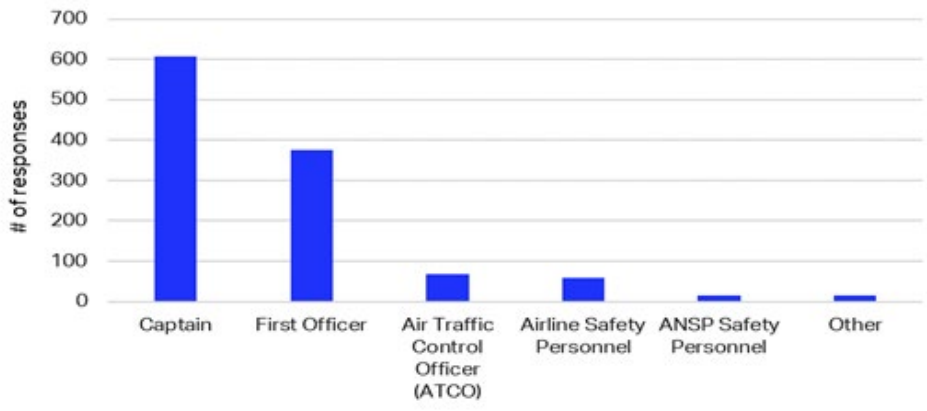
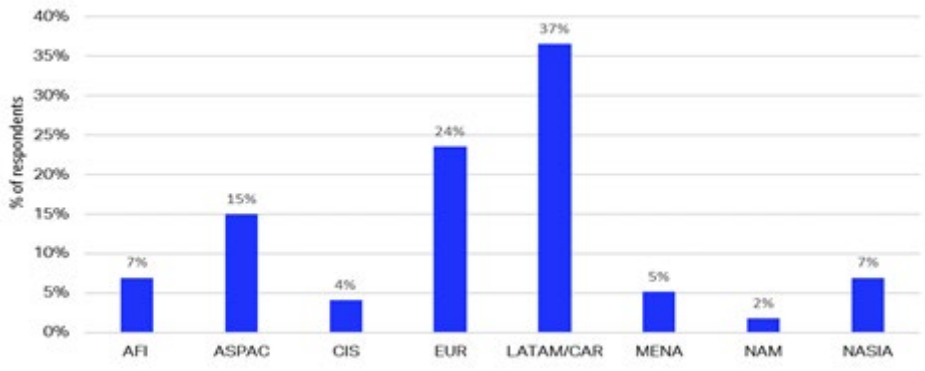


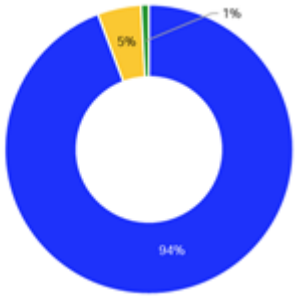
Figure 2 identifies the region where the respondents are based. 37% (417) of the respondents are based in

Latin America and Caribbean region, followed by EUR with 24% (268). The geographical representation of the participants was not evenly distributed.



Figures 3 identifies the aircraft propulsion type that the respondents operate on. Of the 1,024 captains, first officers and retired flight crew, 94% are operating on jet aircraft.

Jet	965
Turboprop	50
Both	9



Figures 4 identifies how many flight legs are flown in a typical duty week. Of the 1,024 responses, 38% responded that they fly less than 5 legs in a typical duty week and 38% fly between 6-10 legs.

Under than 5 legs	393
Between 6 – 10 legs	393
Between 10 – 20 legs	203
More than 20 legs	35

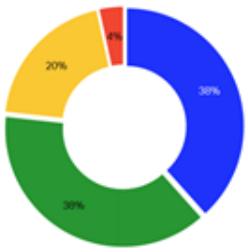
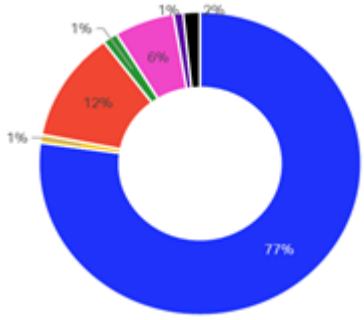


Figure 5 identifies the type of operation of the respondents. The aim is to find out which of the category is more predominant. 77% of the respondents operate on passenger flights.

Passenger Flight	880
Cargo Flight	10
Both (Passenger and Cargo)	134
Airline Safety Personnel	17
ATC	69
ANSP Safety Personnel	11
Other	19



Of the 1,041flight crew and airline responses, 52% are familiar with the guidance material, whereas from the 80 ATCOs and ANSPs responses, 42% are familiar with the guidance material.

Main findings are:

- Those who are familiar with the third edition of the guidance material found it a valuable resource to understand and mitigate the risks of UA
- This 3rd edition of the guidance material is among the top industry resources across all regions used to address unstable approaches
- Variations were noted across industry SOP, such as configuration altitude, gates, stabilized altitude, callouts 'stable', 'unstable' or go-around is apparent
- Survey results indicate areas of improvement for callouts and go-around execution
- A significant number of pilots indicate they are confident in the shared responsibility with ATCO to achieve stable approaches
- Survey results indicate that Pilots are comfortable in alerting ATC when they are unable to comply with any request

The recommendations drawn from the survey results are presented throughout the UA report.

The full report can be found at Appendix "D" to this report.

Final thoughts and considerations from the UA Safety Analysis Team

Due to the successful interaction between the different industry partners that participated in this project, where the principles of voluntary, collaborative, and consensus-based decisions were paired with de-identified, data driven, systemic safety issues analysis, it was unanimously recommended that a "Safety Partners Standing Group" is formed. The objective of the Standing Group would be to collaborate in the mitigation of aviation safety risks, through analysis, development and implementation of safety enhancements, and the promotion and advocacy of such safety solutions developed by the Standing Group and the principles it

follows. Also, to send an open invitation to all other industry safety partners that were not able to participate in this project, to join the a "Safety Partners Standing Group" when it is created.

The Safety Partners Standing Group will also be a conduit for much needed aviation industry activities that could drive industry collaborative activities. Such as the work done by this Unstable Approach - Safety Analysis Team, as well as driving future work that will be done to develop and implement its recommendations under the Unstable Approach - Safety Implementation Team. Other areas where the Standing Group could play a leading role are:

- Clear incentive for conducting further Research and Development, combining the efforts of universities, regulatory agencies, manufacturers, operators, ANSPs and airports to to advance in stable approaches procedures and activities.
- Clear mandate to a healthy and effective Safety Management System from top management, that includes a positive safety culture, safety assurance, safety policy and objectives, risk management, and safety promotion.
- The use of active monitoring and auditing techniques as essential tools to ensure that the required controls established throughout the hazard management process are in place, and that a continued active commitment to safety is maintained.

Recommendations

The first group of recommendations listed in this section are addressed in turn to the Unstable Approach Implementation Team, group that shall be formed to plan, develop, promote, and implement (or track the progress of their implementation as appropriate) of the proposed safety enhancements.

The second group of recommendations are separately and directly address to Air Navigation Service Providers (ANSPs), Airline Operators, and States/Civil Aviation Authorities. They have been grouped in that so that the task/actions can be described and targeted based on their needs, hoping to aid in a successful implementation of the corresponding safety enhancements:

Group 1:

For the Unstable Approach Implementation Team

Develop a Road Map to manage the effective adoption of the Unstable Approach - Safety Analysis Team recommendations. The Implementation Road Map should give each region in the world the possibility to adapt the recommendations according to their level of implementation.

The Road Map should include the following 5 recommendations made for Group 1, as well as the recommendations found in Group 2 for ANSP, Airline Operators and States/Civil Aviation Authorities:

1. The development of an industry standard for Risk Classification and Management of UA following the findings of the Safety Management SRA
    - Develop an industry standard for Risk Classification of UA, including standardized KPI's, to enable effective benchmarking across industry
    - In order to enable the industry to target resources effectively to reduce the risks of UA, create "High Risk" UA definition

2. Promote the consistent implementation by operators of Stable Approach SOP, as recommended by OEM and Regulators.

3. Promote the importance of establishing and actively participating in safety information sharing programs program (ex. EASA - Data for Safety (D4S), FAA - ASIAS, IATA – Flight Data Exchange (FDX))

    - sharing information and collaborating with industry are the foundation for reducing risk of UAs. Without the growth of safety information exchange, and without wide participation in safety groups, the ability to assess and manage risk is limited.

4. Support Regional and Local Safety Groups, leveraging the members of the Unstable Approach Implementation Team that participate in those groups

    - Industry-State collaboration is fundamental for an effective data-driven approach on identifying and reducing high risk UA at the Regional/State/Local level.

5. Promote the 3rd edition of the IATA, CANSO, IFALPA and IFATCA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices, and other industry documents, is of paramount importance. Update the document to the fourth edition once the safety enhancements mentioned herewith in this document have been developed.

Group 2

For Air Navigation Service Providers:

1. Communicate with ATCO and operational personnel organizational initiatives to mitigate risk associated with UA

    - Communication of industry initiatives to address UA in general, to include collaboration at the local level regarding UA risks specific to local operators. This will also promote transparency and a positive safety culture.

2. Engage all stakeholders when developing airspace or procedural changes to mitigate the risk of UA. Ensure safety is prioritized over 'green' procedures when designing SIDS/STARS.

1. Active contribution and participation in safety information sharing programs program (ex. EASA - Data for Safety (D4S), FAA - ASIAS, IATA – Flight Data Exchange (FDX), Asia Pacific RASG - AP Share), and local and regional safety groups.

    - sharing information and collaborating with industry are the foundation for reducing risk of UAs. Without the growth of safety information exchange, and without wide participation in safety groups, the ability to assess and manage risk is limited.

    - Industry-State collaboration is fundamental for an effective data driven focus on identifying and reducing high risk unstable approaches at the Regional/State level.

    - Ineffective UA safety risk management due to incomplete qualitative intelligence (recordings of conversations, written reports, interviews). Too much reliance on quantitative data (FOQA)

2. Follow GAPPRE recommendations for ANSP (002) : With regard to assignment of or change to runway for arriving aircraft

    - Whenever the runway change is pre-planned, notify it to the flight crews as early as practicable, together with the expected time of the change, including by adding relevant information in automatic terminal information service (ATIS) broadcasts, where available.

    - As far as practicable, avoid changing the assigned runway to aircraft on approach or taxiing for departure.

    - Ensure ATCO are aware that runway changes create additional workload, increase vulnerability to error, and that flight crews need time to re-brief and prepare for them.

    - Ensure that the runway configuration change procedure/process takes account of the above points and of the tailwind information, as appropriate.

    - When operationally possible, accept the flight crew's preference for a runway when requested due to performance limitations.

3. ANSP (the approach controller) to provide the flight crew with the track miles information anytime the aircraft is deviated from the planned route and approach procedures.

    - ATC awareness of impact to flight crew energy management that involves adjustment to speed, levels, headings and power settings when there is a deviation from flight planned arrival.

4. Promote the 3rd edition of the IATA, CANSO, IFALPA and IFATCA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices, and other industry documents, is of paramount importance. Update the document to the fourth edition once the safety enhancements mentioned herewith in this document have been developed.

Note: ATCOs would also benefit from additional training in UA risks (include impact of decisions on operations), promoting better understanding between pilot's and ATCO's; and familiarization flights/joint training between pilots and controllers. Incorporating Pilot/Controller Collaboration in training will only affect a small portion of pilots and controllers unless civil aviation authorities take a regulatory approach. An example of such approach can be found in Europe. The EUROCONTROL "ATCO Basic Training – Training Plans" recommends to its members states to include the following training topics in initial training for air traffic controllers: amongst others, they include factors affecting aircraft performance, aircraft performance, structural components, and control of an aircraft, etc…

This approach should also be taken by training organizations and operators to implement a joint training between pilots and controllers. ATC topics to be included in pilot education and training courses such as the primary responsibility of Air Traffic Controllers (the separation of aircraft); limitations of "visual separation" and airspace; effects on controller workload when deviating for weather or when not providing adequate notification when unable to comply with ATC instructions, etc….

For Airline Operators:

1. Active contribution and participation in safety information sharing program (ex. EASA - Data for Safety (D4S), FAA - ASIAS, IATA – Flight Data Exchange (FDX), Asia Pacific RASG - AP Share).

    - With the focus on identifying and reducing high risk unstable approaches by leveraging benchmarking, frequency, causal, and contributory factors.

2. Active contribution and participation in regional and local safety groups (ex. – ICAO-RASG, IATA-RCG, FAA – CAST, ICAO - Runway Safety Teams).

    - Industry-State collaboration is fundamental for an effective data driven focus on identifying and reducing high risk unstable approaches at the Regional/State level.

3. Communicate with operational personnel the organizational initiatives to mitigate risk associated with the underlying conditions of unstable approaches.

    - Promote transparency and positive safety culture (internal communications).

4. The Operator shall have a go-around policy with associated procedures and guidance to ensure, when necessary, flight crews discontinue an approach and execute a Go-Around (GA) in accordance with criteria established by the Operator. Such policy, procedures and guidance shall, as a minimum, address or define:

    - Management support for flight crew go-around decision-making.
    - Criteria that require flight crews to discontinue an approach, or landing, and execute a GA from (prior to the selection of reverse thrust).
    - The go-around manoeuvre.
    - Duties and responsibilities of the PF and PM.
    - TEM pre-departure descent and approach briefings (Appendix "C").

5. Be an active participant in industry groups focused on ANSP changes to airspace or procedures that mitigate the risk of unstable approaches.

6. Consult and implement as appropriate the recommendations listed in the 3rd edition of the IATA, CANSO, IFATCA and IFALPA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices..

7. Ensure that training and SOP follows OEM and Regulators recommendations, and is in accordance with best practices

    - Training should develop core pilot competencies relevant to stable approach performance and mitigations. Maximizing both internal and external safety and training intelligence for continuous improvement.
    - Pilots would also benefit from additional training in UA risks and their operational consequences,

8. Empower flight crew to advise Air Traffic Control when unable to comply with an instruction or a clearance that would decrease safety margins, or would result in the aircraft being too high and/or too

fast, would require approach path interception from above or would unduly reduce separation from other aircraft

For States/Civil Aviation Authorities:

1. Promote to your service providers the 3rd edition of the IATA, CANSO, IFATCA and IFALPA Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices..

2. Active contribution and participation in regional safety groups. Establish local safety groups. (ex. ICAO-RASG's, IATA-RCG, FAA – CAST, ICAO - Runway Safety Teams)

    - Industry-State collaboration is fundamental for an effective data driven focus on identifying and reducing high risk unstable approaches at the Regional/State level.

3. States/Civil Aviation Authorities should encourage and support active participation in a safety information sharing program (ex. EASA - Data for Safety (D4S), FAA - ASIAS, IATA – Flight Data Exchange (FDX), Asia Pacific RASG - AP Share), to focus on identifying and reducing high risk unstable approaches by leveraging benchmarking, frequency, causal, and contributory factors.

    - Implement safety data protection regulations that follow ICAO Annex 19 SARPS.

4. Reinforce the importance of engaging all stakeholders through the entire process when developing changes to airspace or procedures to mitigate the risk of UA

    - Prioritize safety of passengers and crew when it conflicts with evolving environmental controls.

5. Follow the ICAO resolution to replace circle to land approaches with PBN/RNAV approaches that have greater potential for reduction of UA.

Appendix A: Unstable Approach - Safety Analysis Team members:

Airlines			Industry Safety Partners			IATA	
Organization	**Name**	**Last Name**	**Organization**	**Name**	**Last Name**	**Name**	**Last Name**
JAL	Hideaki	Miyachi	CANSO	Shayne	Campbell	Gabriel	Acosta
GOL	Danilo	Andrade	Nav Canada	Bruno	Ochin	Anna	Bernhardt
GOL	Gabriel	Casella	ATR	Sebastien	Sellem	Hanada	Said
GOL	Richard	Kloth	Embraer	Cadu	Martinez	Ruby	Sayed
GOL	Leal	Ortega	Boeing	Sam	Goodwill	Edward	Jumie
GOL	Bruno	Blaya	CAST/FAA	Gerardo	Hueto	Fernando	Rojas
GOL	Camila	Ribeiro	WMO	Greg	Brock	Dragos	Munteanu
AC	Robert	Palmer	IFALPA	Max	Nomico	Jordi	Vicens Obrador
AC	Michael	Carson	ICAO	Paul	Adamson	Honghai	Yang
QA	Dharamraj	Rebbapragada	IFATCA	Jean Francois	Lepage	Zhang	Ti
CL	Mattias	Pak	Honeywell	Yasuo	Ishihara	Stefano	Prola
GOL	Augusto	Viana	CAST/FAA	Crystal	Ferguson	Brent	King
GOL	Gabriel	Casella	EANA	Antonella	Cavacini	Serkan	Simitcioglu
GOL	Richard	Kloth				Jose	Fernandez
JAL	Tatsuo	Seki				Jim	Anderson
JAL	Seiji	Yukimoto				Dan	Vaca
JAL	Toshi	Yuasa				Celso	Figueiredo
FedEx	Dick	Powers				Victoria	Romero
						Yann	Ranier

Airlines	Industry Safety Partners	IATA
		Jonathan Jasper
		Nancy Rockbrune

UA Safety Risk Assessment (SRA) sub-teams' conformation and results:

Energy Management	Pilot/ATCO Interface	Go Arounds	Human Factors	Safety Management
• IATA • GoI Airlines • Boeing • ATR • Japan Airlines • Honeywell • CAST • Fedex	• Qatar Airlines • CANSO • **IATA** • **IFATCA** • **GoI Airlines** • ICAO	• Embraer • WMO • Nav Canada • IATA • Japan Airlines • GoI Airlines • IFALPA	• IATA • Cargolux • GoI Airlines • Air Canada • Cathay Pacific	• CAST • Air Canada • IATA • GoI Airlines • EANA

The following SRAs were performed to serve as guidance and examples to ANSP's, Airlines and Regulators. We encourage each organization to perform their own SRA taking into consideration their own operation and regulations. Use the following SRAs as a reference of "hazards", "existing control", and "additional mitigations" that industry experts have identified for your consideration.

The ICAO Safety Management Manual (Doc 9859) contains comprehensive guidance for both industry and regulators on safety risk assessments. This report does not reproduce large parts of this document, but it is useful to consider the basic elements of safety risk assessment:

Identify the hazards

The first step to conduct a safety risk assessment is to identify potential hazards.

Assess the likelihood of occurrence

After identifying the potential hazards, assess the likelihood of the hazards to occur. (In this document we do not include the likelihood of occurrence since it will vary according to the individual service provider/regulator reality).

Risk Mitigation Measures

Operators should be mindful that threats may arise due to some external factors that are beyond their control. Not all safety risks can be eliminated entirely but operators can consider various approaches to mitigate the risks to as low as practicable and acceptable

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Safety management	lack of internal use of FOQA data (for communication, training, and targets)	Ineffective mitigation of risks identified in your FOQA program		EASA good practice on the oversight of FOQA programs. EASA guidance for the implementation of FDM precursors	Create guidance material to recommend airlines, share risks identified by the FOQA program with other departments. SMS risk management requirements might already do so.
Safety management	Requiring a safety report even in the event of a resulting GA from an UA	Continuance to land from an unstable condition, creating a perception that GA's are undesired.	Incident	SRS required when continue to land from UA. Policy supported by GAPPRE. Existing non-punitive GA policies. IOSA requirement to only report existing or potential hazards.	Promote the GAPPRE recommendation to "not require" the filing of and SRS when an uneventful GA is executed from an UA. Should Recommend practice in IOSA. Reinforce an open and just reporting environment. non-punitive culture (Just Culture).
Safety management	Unharmonized definition of Unstabilized Approaches	Ineffective benchmarking to industry standards if definitions vary. An operator may overestimate safety operational performance as compared to other operators with tighter standards creating a slanted view of actual performance.	Incident	OEM definition. CICTT definitions. Data sharing programs (FDX/ASIAS/D4S).	Promote and adopt CICTT harmonized definitions by airlines. Encourage airlines to join and participate in data sharing programs. Align training taxonomies with safety and operational taxonomies.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Safety management	Ineffective safety risk management due to incomplete intelligence	Lack of safety information sharing from ATC	Hull Loss / Fatalities	Airline SRS, FDM, Safety Information Sharing Programs, RESA, Regional/Local Safety Groups.	Recommend sharing of safety information: performance analysis, investigatory findings, participation in information sharing programs. Holistic methods for aggregating multiple data sharing opportunities with common taxonomies, event definitions, to mutually understood outcomes.
Safety management	Lack of harmonization of data intelligence presentation for comparison	Misalignment of resources toward lower risk hazards. High risk events are not discovered.	Incident	Industry Guidance Material. SOP's. Safety events. Regulatory flight data monitoring guidance material and oversight. Safety Information Sharing programs. FDM service providers. IOSA requirements.	Develop industry, minimum common standards to ensure relevant intelligence is produced from recorded flight data. Enabling sharing and benchmarking. -Two tier FDM UA management: exclusion of momentary exceedance to identify true rate of UA flown. Risk assessment of UA to manage high risk events and identify systemic issues. Safety Information Sharing Programs- Fuse data from service providers to identify, analyse and manage high risk systemic issues and provide benchmarking and intelligence for the industry
Safety management	failure to implement effective regional safety collaboration groups	the group could make decisions based on siloed data, without input from a wider industry participation and lead to a focus on items not related to safety such as compliance or oversight.		GASP, Annex 19, Industry-state information sharing agreements	Industry should develop further guidance on the effective implementation of regional and local safety groups based on the recommendations FAA HLCC paper

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Safety management	States don't have FOQA requirements or guidance for operators	Operators might chose not to implement FOQA or not have an effective implementation and therefore overestimate their safety performance. Safety Information shared with the state will also carry this over estimation of safety performance.		FOQA guidance material and regulations from several states. IOSA Standards. ICAO standards. CICTT FOQA event definitions.	Recommend States to develop FOQA implementation requirements for their operators. Operators and States to actively participate in Safety Information Sharing Groups.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Safety management	Low participation from airlines in safety information sharing programs	1) Inability to perform benchmarking and/or identify common systemic hazards 2) State unable to identify hazards and manage risk appropriately	Incident	ICAO GASP, Annex 19, SMS 9859; FDX, ASIAS & D4S programs	Engage with professional organizations, regulators, local and regional BARs, Manufacturers, ICAO to promote the benefits of Information Sharing Programs to airlines, pilots and their regulators. Communicate the value/outcomes to the industry, and more detailed information to the members, to gain and maintain membership. including the value for the system and not only to the specific airline or regulator. Highlight the safety information protection protocols and policies in place in accordance with Annex 19. And data security. Safety Information Sharing programs should have a strong governance that ensures the information is used for safety purposes only. It should be transparent, open and audited/certified by a 3rd party, and oversight be performed by the participants. Improve the value of analysis to participants. Engage with industry representatives to obtain feedback on reasons why they don't join safety information sharing programs.
Safety management	lack of national regulations to protect safety information and its sources	1) misuse of information by the regulator or third parties, for activities outside safety 2) failure to create a national culture of safety information sharing that		ICAO GASP, Annex 19, SMS 9859	Measure implementation of information sharing regulations in the USOAP audit and rank countries accordingly. Propose to ICAO to highlight safety information protections in their USOAP reports to countries.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
		will enable hazard identification			
Safety management	Unrealistic expectation of aircraft type performance	Approaches not optimized for the performance of AC operating into an airport	Incident	Airline SOPs, Manufacturer performance limitations, FDM program, Regulatory Oversight	Use of performance limitations from manufacturers to optimize approaches for safety and efficiency. Sharing of aggregated and unidentified UA intelligence with technical groups designing approaches.
Safety management	Environmental pressures to reduce emissions and noise abatement.	Failure to consider flight safety and performance characteristics when designing arrivals.	Hull Loss / Fatalities	ICAO SARPS, Regulations, SOP's, best practices for the design of safe SIDS/STARS. FDM programs and data sharing programs for benchmarking.	Prioritize safety of passengers and crew when it conflicts with green procedures by: 1- Supporting regulators when designing SIDS/STARS. 2 - Ability for the flight crew to deviate from green policies to ensure the safety of flight.
Safety management	ATC guidance deviating from the expected briefed, approach path	Reduced margin for energy management.	Hull Loss / Fatalities	Crew authority to refuse. SOP's, published approach procedures.	Develop a means for ANSP's to share tactical information on expected arrivals and operators to share best practices as well as impacts on performance. Better education of the ANSP's on aircraft performance and the restrictions impact on stabilized approaches.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Pilot ATCO interface	Lack of situational awareness as a consequence of changes to the anticipated/planned procedures at/below 10000ft	Late runway/approach type change combined with the lack of preparedness to react by the crew, resulting in an Unstabilized Approach	Unstabilized Approach (UA) that could lead to runway incidents, e.g. excursions or go-around. Go arounds are used as a mitigation measure when a UA occurs but they could lead to additional workload for ATCOs.	1. Sim sessions to ensure that crew can recognize an UA Mitigations to manage the consequence of an UA: 1. SOPs and Airline internal policy covering flight deck procedures for go around 2. Manual ATS (MATS) - including go around procedures for ATC	1. Improvement/better procedures for go around and better mutual understanding between ATCOs & pilots about consequences of operational decisions. 2. Reinstating FAM flights and ATCO-Crew forums 3. Additional combined training (crew and ATCOs about energy management and impacts of decisions) 4. Ensure that procedures for selecting runway in use and managing runway in use changes are clear and effective. 5. Ensure runway changes are (as far as possible) planned in advance, with flight crews forewarned.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Pilot ATCO interface	Lack of situational awareness as a consequence of changes to the anticipated/planned procedures after hand off to aerodrome control	1. Last minute change without full awareness of the impact on crew 2. Pilots expectations vs ATCOs constraints and vice-versa	Unstabilized Approach (UA) that could lead to runway incidents, e.g. excursions or go-around. Go arounds are used as a mitigation measure when a UA occurs but they could lead to additional workload for ATCOs.	1. Sim sessions to ensure that crew can recognize an UA Mitigations to manage the consequence of an UA: 1. SOPs and Airline internal policy covering flight deck procedures for go around 2. Manual ATS (MATS) - including go around procedures for ATC	1. Improvement/better go around for ATCOs/pilots 2. Reinstating FAM flights and ATCO-Crew forums 3. Additional combined training (crew and ATCOs about energy management and impacts of decisions)

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Pilot ATCO interface	COVID impacts on the operational environment with potential risk of degradation of certain skills that may cause lack of adherence to standard procedures and policies	1. Global impacts of the outbreak of the pandemic on training and ability to continue with recurrent and OJT training 2. Rustiness due to low traffic levels and reduced operation for a period of time - risk of reduced staff/skills during ramp up and after recovery 3. Reduced operations during the pandemic motivating short-cuts combined with possible degradation of some skills. Shortcuts reduce track miles to touchdown, which in turn can lead to an Unstabilized Approach 4. Due to long periods of reduced operation, there is a risk of reduced adherence to standard phraseology.	Unstabilized Approach (UA) that could lead to runway incidents, e.g. excursions or go-around. Go arounds are used as a mitigation measure when a UA occurs but they could lead to additional workload for ATCOs.	1. Competency assessments after recurrent training. 2. Assessments used to reinforce best practices to avoid go-arounds, as well as reiterating the main causes of UA, and what can be done to avoid them. 2. Quality control of existing training and implementation	1. Where available, use of simulators to practice higher traffic levels 2. Work with regulators and training organizations to address backlog of licenses and medical revalidation caused by COVID 3. Prioritize sim-sessions for staff with extended licenses 4. Collaborative approach to align capacity with ramp up rate/traffic demand 5. Encourage the establishment of a Runway Safety Team (RST) by airport operator

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Pilot ATCO interface	Human Factors in a changing operational environment	1. Quick/unexpected ramp up of operations combined with loss of staff (specifically crew) resulting in additional workload /fatigue 2.New stressors caused by the outbreak of the pandemic adding pressure on pilots and controllers (including health concerns related to infection especially with the new variants) 3. Operationally related pressures, e.g. pressure for on time departures with all added ground/capacity constraints 4. Impact of job security on decision making, e.g. a study shows that in 63% of Unstabilized Approaches events, pilots continued to land. There might be added pressures caused by COVID.	Unstabilized Approach (UA) that could lead to runway incidents, e.g. excursions or go-around. Go arounds are used as a mitigation measure when a UA occurs but they could lead to additional workload for ATCOs.	1. Just Culture environment 2. Corporate wellbeing programs	1. Risk assessment taking into account pandemic impacts of human performance 2. Added emphasis on wellbeing programs 3. Additional internal briefings and informal training 4. Empathetic approach to performance/service level evaluation 5.Collaborative approach to align capacity with ramp up rate/traffic demand 6. Encourage the establishment of a Runway Safety Team (RST) by airport operator

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Pilot ATCO interface	Procedures and Design affecting decisions made by crew/ATCOs	1. ATCO/crew not fully familiar with approach procedures 2. Frequently and rapidly changing procedures in general, creating confusion. 3. Resistance to implement/use new procedures 4. Airport/airspace design 5. Noise abatement procedures	Unstabilized Approach (UA) that could lead to runway incidents, e.g. excursions or go-around. Go arounds are used as a mitigation measure when a UA occurs but they could lead to additional workload for ATCOs.	1. Change management - internal training and briefings to ensure effective adoption of new procedures (build internal trust). 2. Process for advising stakeholders of changes to procedures	1. Joint training sessions for crew and ATCOs 2. Joint sessions (crew and ATCOs) to explain new procedures and aircraft performance (how decisions will impact energy management) 3. Conduct a review of airspace structure (where needed)

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Pilot ATCO interface	Additional disruptions on top of the constrains brought about by COVID, affecting ATCO decisions and workload and aircraft operations	Additional disruptions while still recovering from COVID with all the added elements, e.g.; 1. Weather events in a location that has not had normal levels/complexity of traffic in a long period of time 2. Unauthorized operations, e.g. drones during traffic ramp up 3. Any emergency or abnormal situation that an ATCO/pilot has not been experiencing in a long time. It may be that the last time the ATCO was in the sim to practice such weather, non-radar or emergencies procedures was BEFORE the pandemic.	Unstabilized Approach (UA) that could lead to runway incidents, e.g. excursions or go-around. Go arounds are used as a mitigation measure when a UA occurs but they could lead to additional workload for ATCOs.	1. Reinforce contingency planning and updates to the contingency SOPs as required. 2. Sim sessions to practice abnormal situations, emergencies, degraded modes, etc. At least for ATCOs.	Review existing contingency plans to make sure they are up to date and still relevant in case they need to be revised

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
HF/Non compliance	Missed checklist items, speed control, delay config selections. No executing a go-around(compliance)	Organizational pressure - On time , fuel conservation	Worst case - Accident Most likely foreseeable - Incident - Long landing, hard landing, runway excursion. Misconfiguration on landing.	Stable approach criteria. Stand SOP. CRM. FDA monitoring. Pilot awareness campaigns. LOSA. Training. Operational learning review (best practice?)	Operational learning review (Pete to send, Bob - Safety round table). Education in "stress" management. Develop a culture of non-punitive (just or learning culture) and encourage go-arounds when stable criteria is not met. Sharing of industry best practices.
HF/Non compliance	Missed checklist items, speed control, delay config selections. No executing a go-around(compliance)	Peer pressure - "I can fix this" CRM breakdown.	Worst case - Accident Most likely foreseeable - Incident - Long landing, hard landing, runway excursion. Mis-configuration on landing.	CRM training. Safety leadership. Standard SOP's. Training in competency markers. LOSA. Operational learning review.	Operational learning review (Pete to send, Bob - Safety round table). Education in leadership and communication. Develop a non-punitive culture and encourage go-arounds when stable criteria is not met. Sharing of industry best practices. Safety leadership presence. Develop and implement competencies.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
HF/Non compliance	Over confidence of a successful outcome.	Risk perception - i.e., there is more risk to execute the Go Around than to continue to land.	Incident - long landing, hard landing, runway excursion, undershoot, tail strike.	Pilot monitoring, CRM, SOP's, Training, LOSA, Operational learning review.	Reinforce positive GA culture. Leadership competency. Normalizing GA execution starting from initial training to drive culture shift. Positive reinforcement when GA is executed. Harmonization of approach gates, CRM, and Leadership communication.
HF/Non compliance	Missed checklist items. Unacknowledged call outs. Continuation of a recognized instability. Crewmember will not call out deviation from a standard.	Culture that does not encourage/support pilot monitoring (PM) to speak up	Incident - long landing, hard landing, runway excursion, undershoot, tail strike.	CRM, SOPs, Training (soft skills), positive reinforcement. CBTA (check with Victoria for proper wording)	Update training to include best practices. Conduct HF studies that move from theoretical to practical application for problem mitigation.
HF/Non compliance	Acceptance of early turn in, keep speed up, etc that would normally be rejected. Unfounded belief that acceptance of approach short cuts will benefit the organization. (see above)	Fear of organizational survivability providing increased pressure for operational efficiency	Hull Loss / Fatalities	CRM, SOPs, Training, positive reinforcement. Encourage extra vigilance. Pilot competency (leadership and teamwork)	Senior leadership communication, organizational transparency. Update training to include best practices. Conduct HF studies that move from theoretical to practical application for problem mitigation.
HF/Non compliance	Using an outdated SOP which creates conflict.	SOP Change management - Flight crew unaware/unfamiliar with changes to SOP both during pre and post COVID operations.	Incident	Return to flying courses. CRM, SOPs, Training, positive reinforcement. Encourage extra vigilance. CBTA,	Greater scrutiny of operations via internal FDM programs and global sharing programs. Reinforce non-punitive policies and learning culture.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
HF/Non compliance	Crew recency composition. Pairing crew members where two low recency pilots are paired.	Skill fade, currency, over confidence. flat skill gradient.	Hull Loss / Fatalities	Organizational policies regarding crew pairing. Add flag in automated crew pairing software to look at recency for crewmembers when pairing.	Formalize the leadership communication of Captain inquiry to pairing regarding recency. (Best practice)
HF/Non compliance	Normalized deviation. Drift to failure.	Organizational complacency - acceptance of deviation from the SOP's by both management and peers.	Hull Loss / Fatalities	Training, LOSA, external and internal quality audits. Safety leadership. Labour group safety leadership.	Shared accountability. Review of SOP and performance to minimize drift. Operational learning review. Work assurance (data programs) Senior leadership reviewing the data that an organization has (lead by example). Townhall discussion. Open, effective and bi-directional communication. A listening culture.
HF/Non compliance	Crew may not decline a clearance which would put the aircraft in an unstable condition.	Energy management has changed with decreased traffic with more straight in, and visual approaches.	Incident	Leadership training. CRM. Experience. Competency assessment. Workload management.	Leadership competency. ATCO education on aircraft performance limits. Pilot/ATCO communication strategies. Explore if ATCO has stable gate criteria. ICAO prescribed, standard prescriptive for vectoring (track miles to touchdown)
HF/Non compliance	Distraction, loss of situational awareness, missing checklist items, complacency, Mode (automation) confusion. .	Fatigue - end of duty day	Incident	FRMS, duty time regulations, professional standards. CRM model on fatigue. Awareness training. ASRF.	Self-removal from duty policy. Hazard identification briefing at top of descent (best practice). Encourage wider use of ASRF.
HF/Non compliance	Distraction, loss of situational awareness, missing checklist items, complacency, Mode (automation) confusion. .	External concerns (health and well being of family) causing distraction during descent and arrival)	Incident	Captain assessment of crew readiness for duty. Personal assessment of readiness. Organizational support programs. CRM. Situational Awareness is a competency in CBTA.	Peer support (best practice) *Pilot Resource Crew Committee*. Additional training for Captain in crew assessment of readiness. Leadership in reducing the stigma surrounding mental health and wellness issues.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
HF/Non compliance	Acceptance of a clearance that puts the flight in an unstable condition. UA criteria which is unexpected by the ATCO	Communication between flight crew and ATCO's	Incident	Stable approach criteria. Flight crew authority. Simulator and Line training. Procedural approaches. Standard phraseology and expected communications. Broader awareness of respective roles.	Better ATCO awareness of aircraft performance characteristics. Positive reinforcement when flight crew execute a go-around.
HF/Non compliance	Non-compliance with process and procedures, Poor communication, fear-based leadership, Limited cooperation. Lack of safety reporting leading to minimal visibility to operational safety state.	Ineffective Global acceptance of safety leadership, CRM, Just and restorative culture (learning culture).	Hull Loss / Fatalities	Regulation, CRM training, Just Culture training, Leadership training, reporting culture. SOP's.	Enhanced safety leadership. Transparency of reported hazards and risks. Mentoring and coaching. Enhanced CRM that focus on culture and communication.
Go-around and consequences	LOC	Strong winds / gusty winds / cross winds	Hull Loss / Fatalities	Training, operational thresholds/performance limitations (max x-wind), aerodrome observations/forecasts/warnings, low level wind shear warnings/alerts	
Go-around and consequences	LOC	Low visibility / low cloud	Hull Loss / Fatalities	ILS, training, nav facilities, weather minima thresholds, aerodrome observations/forecasts/warnings	Recommendation - on-board/cockpit synthetic vision systems or enhanced vision systems
Go-around and consequences	LOC	Thunderstorms / Severe weather including hail / Turbulence / Heavy	Hull Loss / Fatalities	Ground stop (levels of service @ a/p), training, aerodrome observations/forecasts/warni	Recommendation: Increased awareness to initiate different levels of service at the airport due to severe weather, right up to ground stops, CRM, decision making

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
		precipitation / wind shear		ngs, low level wind shear warnings/alerts	
Go-around and consequences		Contaminated runway	Hull Loss / Fatalities	GRF, procedures for clearing, braking control (existing procedure with pilots report), training	
Go-around and consequences	CFIT	Go-around after missed-approach point	Hull Loss / Fatalities	performance calculation (not used by all - will become an IOSA SARP), training, pay attention to meteorological conditions, SOPs,	Recommendation: Additional procedures / guidance for go-arounds after missed-approach point, visual (heavily dependent on CRM)
Go-around and consequences	LOC	Busy airspace / traffic interference (vs. operational demands* - impact on decision making)	Hull Loss / Fatalities	ATC procedures, airspace design, ATFM, clear communication,	
Go-around and consequences	LOS	Busy airspace / traffic interference	Hull Loss / Fatalities	ATC procedures, airspace design, ATFM, clear communication, TCAS, training, enhanced surveillance (e.g. "mode S", time based separation, space based ADSB, M-LAT)	Future: collaborative system between a/c and controllers
Go-around and consequences	LOC	Controller questions adding to workload (balance)	Hull Loss / Fatalities	Training, clear communication	Recommendation: Introduce an SOP that when crew perform a go-around as they are uncomfortable, nothing that would impact other / following traffic, state for "operational reasons". ATC to then get details after landing

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Go-around and consequences	LOC	ATC change go-around manoeuvre (deviating from published procedure - increases workload for pilots) - EASA SIB	Hull Loss / Fatalities	EASA SIB * Training	Recommendation - Training / awareness on situation and impact of deviations
Go-around and consequences	LOC - Ops LOS - ATC Abnormal runway contact	Startle effect - impact on decision making	Hull Loss / Fatalities	Training, SOPs (anyone can call for go-around),	Recommendation: Introduce an SOP that allows (any qualified pilot in the flight deck / augmented crew) for initiating go-arounds CRM
Go-around and consequences	LOC - Ops LOS - ATC	High workload	Hull Loss / Fatalities	Training, task sharing, SOPs, memory items, CRM, use of automation *	
Go-around and consequences	LOC - Ops LOS - ATC	Non-standard manoeuvres	Hull Loss / Fatalities	Training, SOPs, CRM, use of automation *	Future: collaborative system between a/c and controllers Current: FDM analysis
Go-around and consequences	LOC	Sensory Illusion	Hull Loss / Fatalities	Training, task sharing, CRM, SOPs	SG recommendation 2012 - ACTF recommendations - after Russia accident / Tripoli accident - 2013-2017 Don Bateman reference recommendations - enhanced warnings
Go-around and consequences	Runway excursion / contact / hard landing….	Decision making bias	Hull Loss / Fatalities	Training, CRM	Recommendation: Educate go-arounds as a normal procedure, replace "landing" call out with "continue" , awareness of decision making bias, training, debriefs, includes ATC (shift- Pilots GA safety procedure, ATC undesired event) Safety 2

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Go-around and consequences	LOC CFIT LOS	Mishandled Go-around	Hull Loss / Fatalities	Training, CRM, TEM, SOPs	
Go-around and consequences	CFIT	Air Navigation Issues (technical failures) *	Hull Loss / Fatalities	Alerts, SOPs, Training, Change to levels of service, technology (e.g. virtual glide slope)	
Energy Management	Environmental	Gusts, Windshear and Tailwind below stabilization height. Gradual shift to tailwind.	High sink rate. Low on glideslope. High on glideslope. Overrun. Hard landing.	Stabilized approach criteria. Windshear detection system. Pilot monitoring. Callouts. SOPs.	Reinforce benefit of frequent scanning of wind direction and strength on nav display. Software review to assess availability of wind information on Nav display bearing in mind HF and time available to check. Exercise the ability to adjust the configuration and/or Vapp/Vref for landing based on knowledge of the conditions.
Energy Management	ATC Instructions	High speed instruction or altitude restrictions to near stabilization height.	High speed or high on approach profile. High rate of descent to recapture approach profile.	Pilot refusal to accept instructions. Part C document route information guide provides advance information to support pilot decision. Pilot awareness and technique.	ANSP - ATC training on potential impact of instructions. ATC operational familiarization on aircraft. Enhance training (including simulator and HF) to include challenging ATC instruction when appropriate.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Energy Management	Weight and balance	Passengers moving between zones on flights with light passenger load. Incorrect cargo loading	Unstabilized aircraft with inconsistent airspeed	Restrictions on passengers re-seating in different seating zones on flights with low load factor. Weight and balance compliance. Load control compliance.	Crew briefing - appropriate to flights with low passenger loads highlighting hazard.
Energy Management	Environmental	Turbulence - anticipated or not.	Attitude changes, speed changes, impact on stabilization criteria	Automation. Forecasting. ATC information.	Turbulence Aware
Energy Management	Crosswind	Improper correction	Lateral deviation. Runway excursion. wing/pod contact. Hard/unsatisfactory landing.	Training. Forecasting. ATC. Automation. SOPs.	Enhanced Simulator training. Enhanced theory training for crosswind landing. Review SOPs and enhance where necessary. Consider pilot experience and apply appropriate crosswind landing limits. Consider limits for runway condition and attributes.
Energy Management	Poor management of descent profile	Late at FAF	High Speed. High VS	Automation (including FMS). Descent planning. Briefing. Training. Route Guide/manuals. SOPs.	Enhance simulator training to include late clearance, high approach etc. Line Operation training/checks to provide emphasis.

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Energy Management	Configuration	Late gear/flaps. Flap exceedance	High Speed; High VS. Runway overrun.	SOPs.	Training and awareness of potential deviation from SOPs caused by other external factors (e.g. ATC instruction etc).
Energy Management	Thrust Management	Low Thrust	Low speed. Stall. Low on Glideslope. Potential tailstrike. Hard landing. Runway undershoot.	Automation. Training, SOPs. Stall warning and other visual indication warnings.	Review Flight Safety Foundation - Approach and Landing Accident Reduction. Consider use of available auto thrust systems.
Energy Management	Thrust Management	High Thrust	High Speed. High on Glideslope. Hard landing. Long landing. Runway overrun. Go around.	Automation. Auto throttles. Training. SOPs. HUD Energy cue (visual indications if fitted). Too high Glidepath alert (if fitted).	Pilot monitoring callouts. SOP requiring Go around.
Energy Management	Pitch Management	Incorrect pitch management during flare	Hard landing. Long landing/overrun. Nose gear touchdown. Tail strike.	Automation. SOPs. Limits for acceptable pitch. Training. Long landing alert.	Training

Operational area	Event/risk	Hazard	Consequence (worst case scenario)	Existing Controls	Additional mitigations
Energy Management	High speed capture of localizer	Overshoot on localizer. (Could be caused by strong tailwind)	Conflict with other traffic or terrain	SOPs- Flight pattern speeds. Appropriate ATC vectoring. (HF) Training	
Energy Management	Transition from automation to manual flight	Destabilization from automated approach due to pilot handling skills and increased workload.	High rate of descent below 200 feet AGL. Long landing, hard landing, Incident/Accident	Simulator training. required currency in manual landing.	Review of existing training. Professional standards and manual handling techniques.

Appendix B: Stable Approach Criteria

In accordance with the 3rd edition of the Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices, an approach is considered stable when it meets the associated conditions typically defined by an air operator in their Standard Operating Procedures (SOP), as they may possibly relate to:

- Range of speeds specific to the aircraft type; usually by reference to V_{APP} or V_{REF}
- Power/thrust setting(s) specific to the aircraft type;
- Range of attitudes specific to the aircraft type;
- Configuration(s) specific to the aircraft type;
- Crossing altitude deviation tolerances;
- A range of path deviation;
- Maximum rate of descent; and,
- Completion of checklists and flight crew briefings.

Stabilized approach criteria should be defined for all approaches and should include that:

- Approaches be stabilized by at 1,000 feet (ft) above airfield elevation when in instrument meteorological conditions (IMC);
- All approaches be stabilized at 500 ft AAE in visual meteorological conditions (VMC);
- A call be made upon reaching 1000 ft AAE in IMC or 500 ft AAE in VMC as to whether the approach is stabilized or not;
- The approach remains stabilized until landing;
- If an approach is not stabilized in accordance with these requirements, or has become destabilized afterwards, a go-around is required.

Appendix C: Decent and Approach Briefing

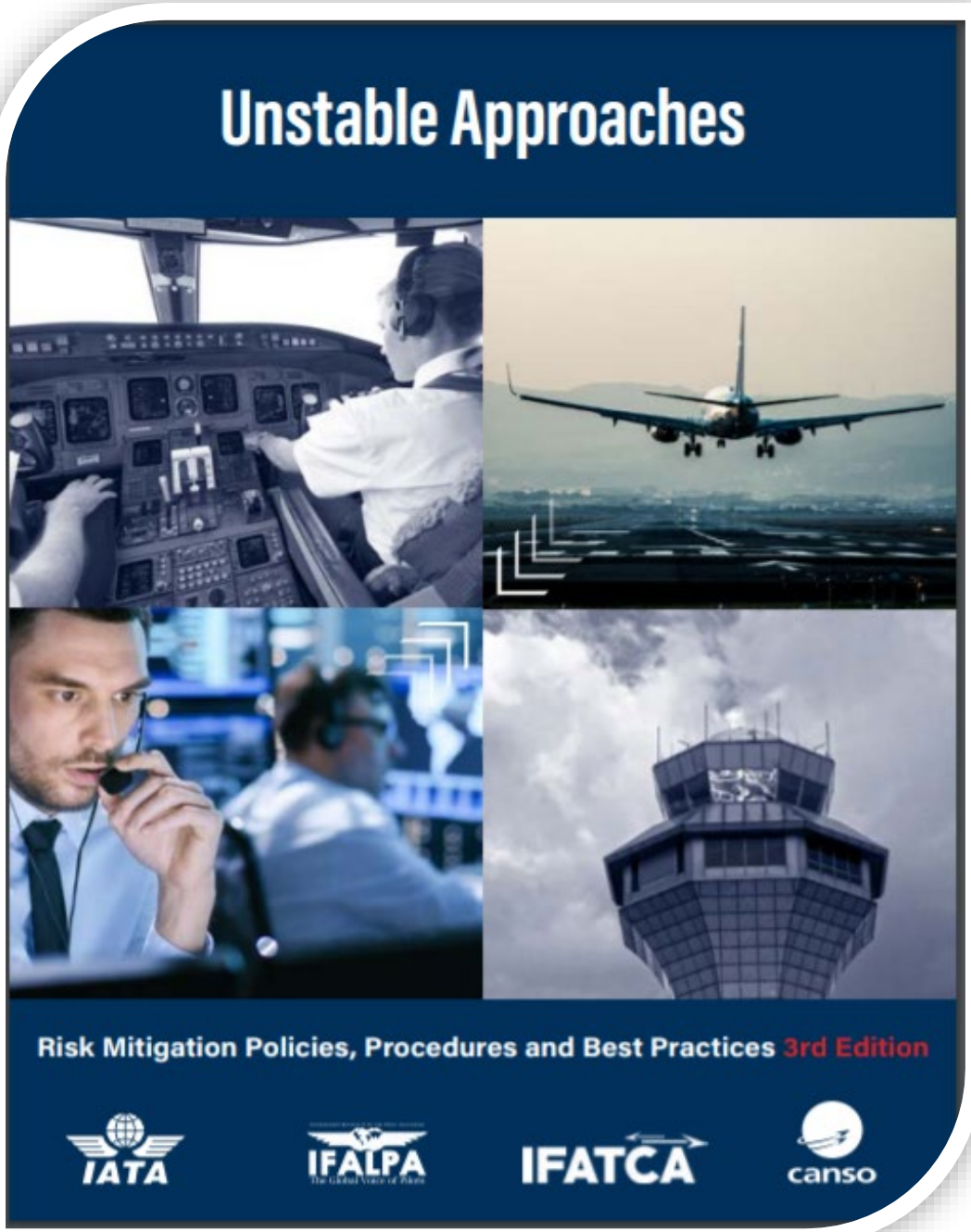
In accordance with the 3rd edition of the Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices, the descent-and-approach briefing should include the following generic aspects of the approach and landing:

- Approach conditions (i.e., weather and runway conditions, special hazards);
- Lateral and vertical navigation (including intended use of automation);
- Stable approach criteria;
- Instrument approach procedure details;
- Go-around and missed approach;
- Diversion;
- Communications;
- Non-normal procedures, as applicable;
- Review and discussion of approach-and-landing hazards; and,
- Expected restrictions, delays and other non-standard aspects of the approach, as advised by ATC.

Specific to the approach and go-around, the briefing could include the following:

- The threats associated with the day of operation;
- Minimum sector altitude;
- Terrain and man-made obstacles;
- Other approach hazards, such as visual illusions;
- Applicable minima (visibility or runway visual range (RVR), ceiling as applicable);
- Applicable stabilization altitude/height (approach gate or window);
- Final approach flight path angle and vertical speed;
- Go-around altitude and missed approach procedure;

Appendix D: Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd Edition)



Survey Results

Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd edition)

IATA

Overview

- In 2017, IATA, jointly with CANSO, IFALPA and IFATCA, published the 3rd edition of the Guidance Material (GM) on Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices.
- In our continuing effort to ensure the applicability and quality of the published Guidance Material, a survey, consisting of a number of questions, has been conducted to investigate the barriers and enablers in the implementation of such guidance.
- Two questions are intended for IATA's use only and thus are not included in this presentation.
- The survey consist of three sections, the fist section is demographic, the second section addresses Pilots and Operators and the third addresses Air Traffic Control Officers (ATCOs) and Air Navigation Service Providers (ANSPs)

Survey Questions

Section 1: Demographic

- Questions 1 to 4 were answered by all respondents (1,140 participants)

Section 2: Pilots and Airline safety personnel

- Questions 5-9 were answered by pilots, flight officers and airline safety personnel (1,041 participants)

Familiar with the IATA/CANSO/ IFALPA/IFATCA Guidance Material (GM) on Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd edition)

- Questions 10-14 were answered by pilots, flight officers and airline safety personnel who are familiar with the GM (537 participants)

All survey participants under this section

- Questions 15-36 (1,041 participants)

Survey Questions

Section 3: Air Traffic Control Officer and Air Navigation Service Providers

Familiar with the IATA/CANSO/ IFALPA/IFATCA Guidance Material (GM) on Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd edition)

- Questions 37-43 were answered by ATCOs and ANSP safety personnel who are familiar with the GM (34 participants out of 80 participants)

All survey participants under this section

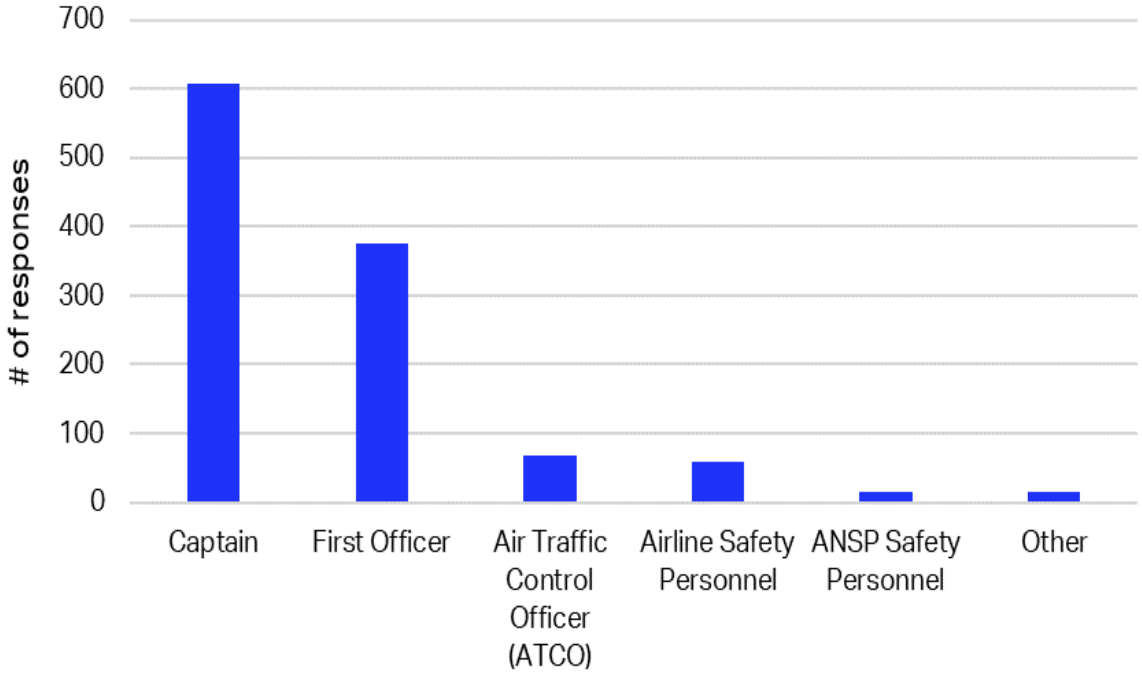
- Questions 44-55 (80 participants)

Conclusion

- Those who are familiar with the GM, found it a valuable resource to understand and mitigate the risks of unstable approaches (UAs)
- This 3rd edition document is among the top industry resources across all regions used to address Unstable Approaches
- Variations were noted all across the industry in SOPs, such as configuration altitude, gates, stabilized altitude, callouts ‘stable’, ‘unstable’ or go-around is apparent
- A significant number of pilots indicate they are confident in the shared responsibility with ATCO’s for stable approaches
- Survey results indicate areas of improvement for callouts and go-around execution
- Survey results indicate that Pilots are comfortable in alerting ATC when they are unable to comply with any request
- Survey results indicate that operators and ANSP/ATSU should collaborate together to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

Question 1: Are you a/an

- Captain 607
- First Officer 376
- Air Traffic Control Officer (ATCO) 67
- Airline Safety Personnel (*) 59
- ANSP Safety Personnel (*) 15
- Other 16



This question is a background question to identify the respondents' position. 1,140 responses in total, 86% of which are Captains and First Officers

*** Some of the Airline and ANSPs Safety Personnel are captains and first officers**

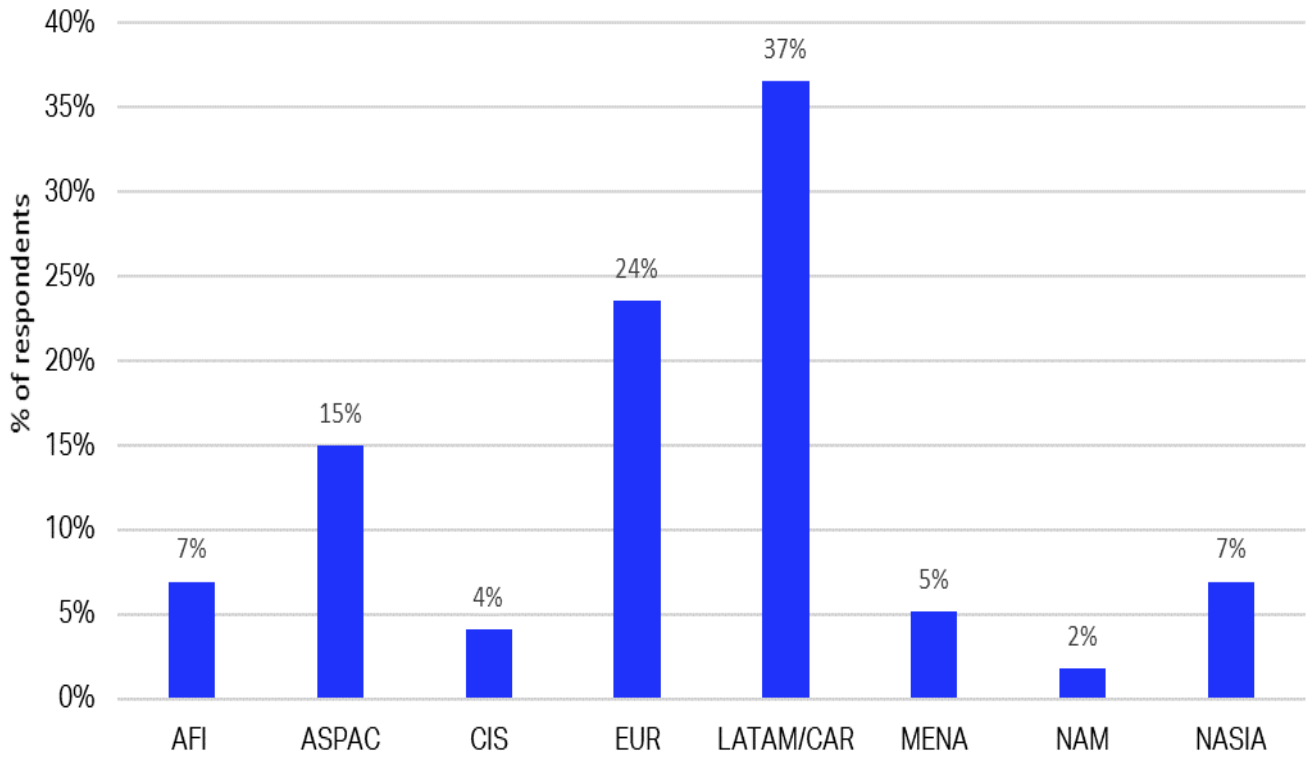
Question 2: If you selected “Other” in previous question, please specify your position

16 responses selected others, but not all indicated their position. They are either

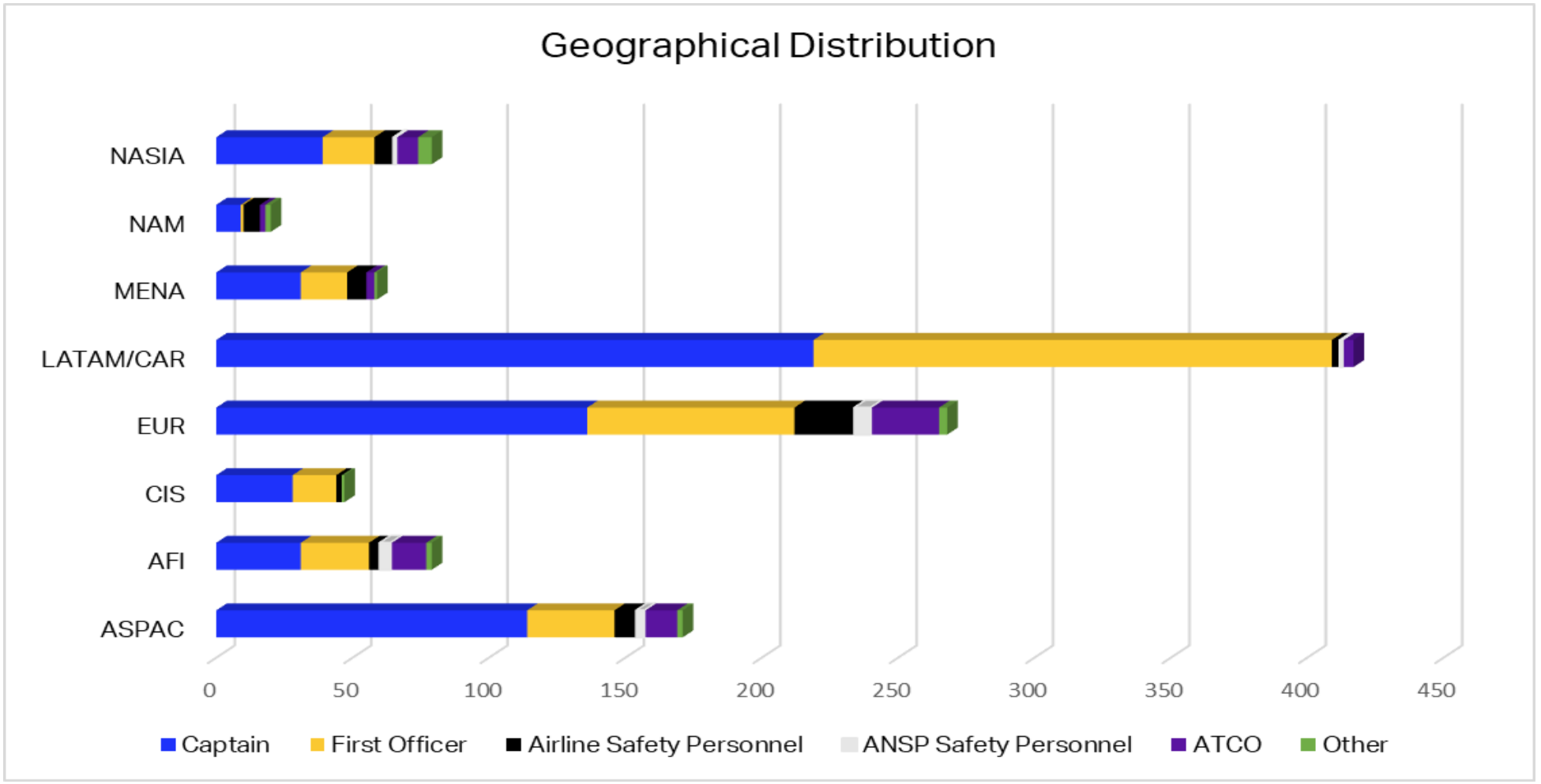
- Flight Operations Manager
- Flight Ops Deputy Manager - non pilot
- Manufacturer - Flight Safety Director
- Flight Data Analyst
- Flight Engineer
- Retired Captain
- Civil Aviation Authority
- Technical Programs Leader - FSF
- Aviation Safety Non-Profit
- Loss adjuster
- Aviation enthusiast

Question 3: Where are you based?

- Africa (AFI) 79
- Asia Pacific (ASPAC) 171
- Commonwealth of Independent States (CIS) 47
- Europe (EUR) 268
- Latin America and Caribbean (LATAM/CAR) 417
- Middle East and North Africa (MENA) 59
- North America (NAM) 20
- North Asia (NASIA) 79



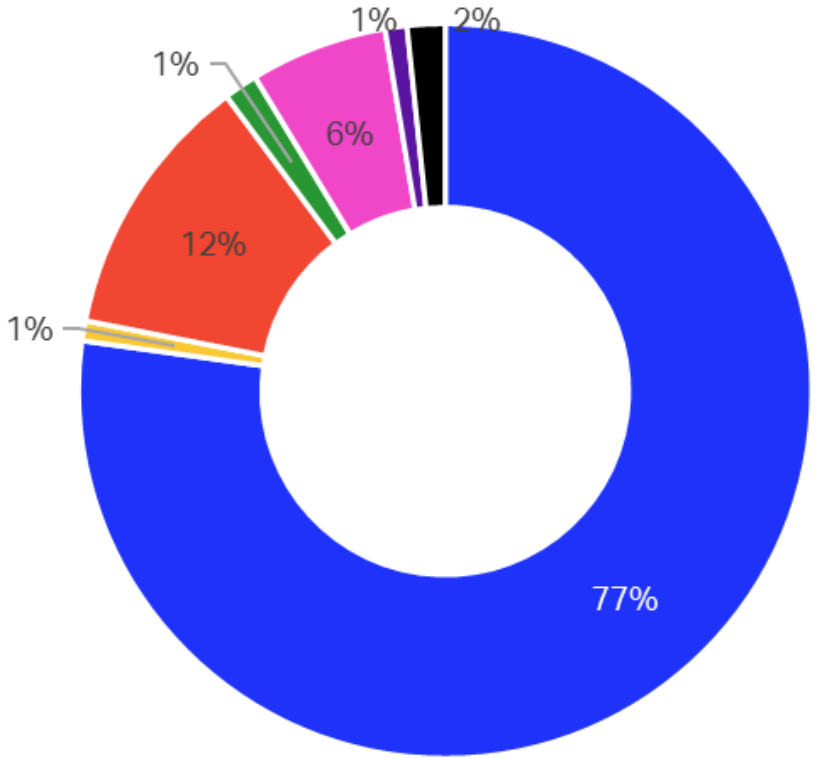
37% of the respondents are based in Latin America and Caribbean region. The geographical representation of the participants was not quite adequate, although there were no set targets, AFI, CIS, MENA, NAM and NASIA did not participate in the numbers expected.



53% of LATAM based respondents are captains and 46% of them are first officers followed by AFI based respondents with 39% captains and 32% first officers

Question 4: What is your type of operation?

- Passenger Flight 880
- Cargo Flight 10
- Both (Passenger and Cargo) 134
- Airline Safety Personnel 17
- ATC 69
- ANSP Safety Personnel 11
- Other 19

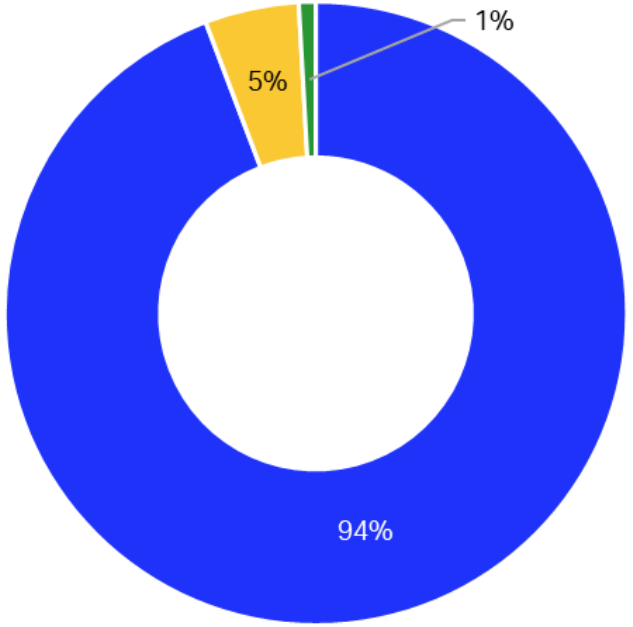


- **The aim of this question is to find out which of the category is more predominant. 77% of the respondents operate on passenger flights.**
- **1% consist of passenger/cargo flights and Airline safety personnel**
- **1% consist of ATC and ANSPs Safety personnel**
- **2% consist of "Other" and those who selected 'Other' as a category did not proceed to the next question – the survey ended here**

Survey Questions Addressing Pilots and Operators

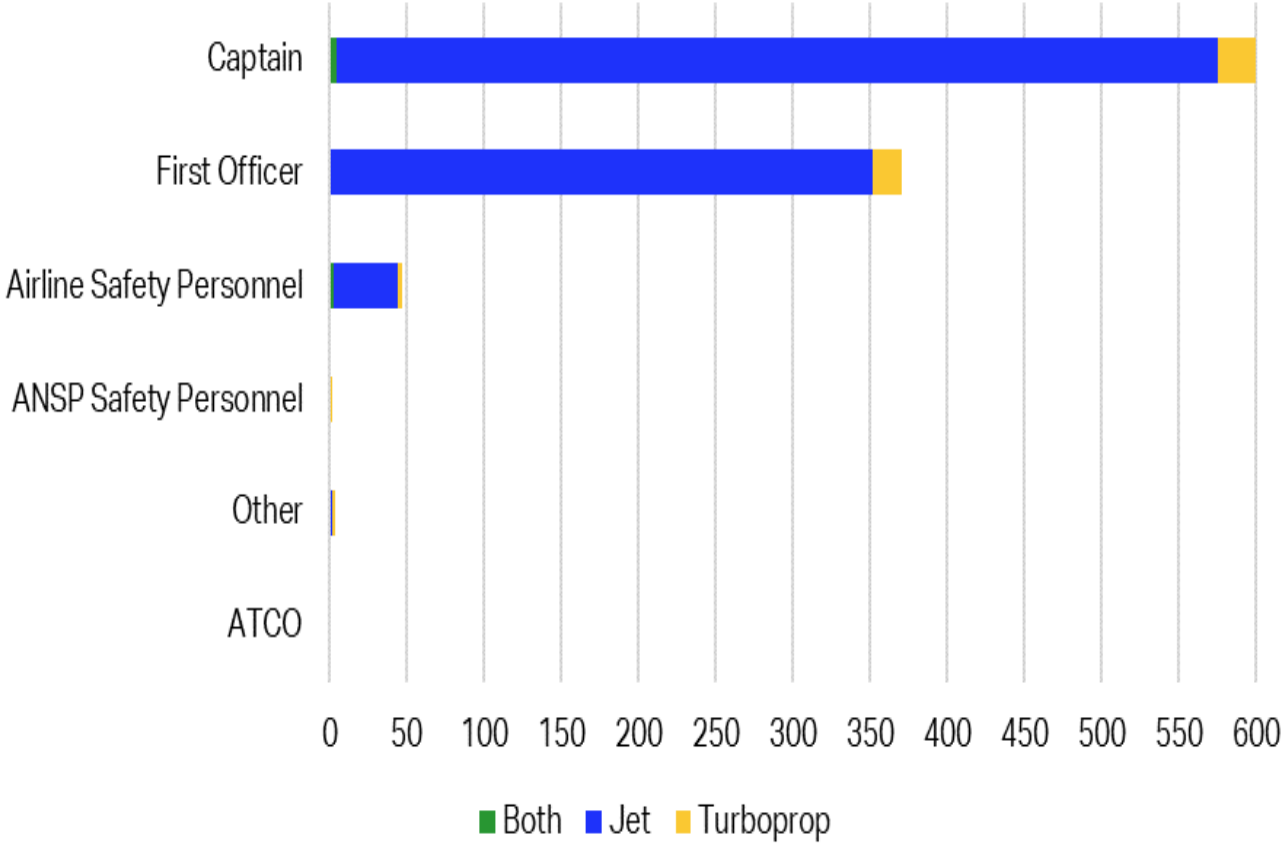
Question 5: What aircraft propulsion type do you operate?

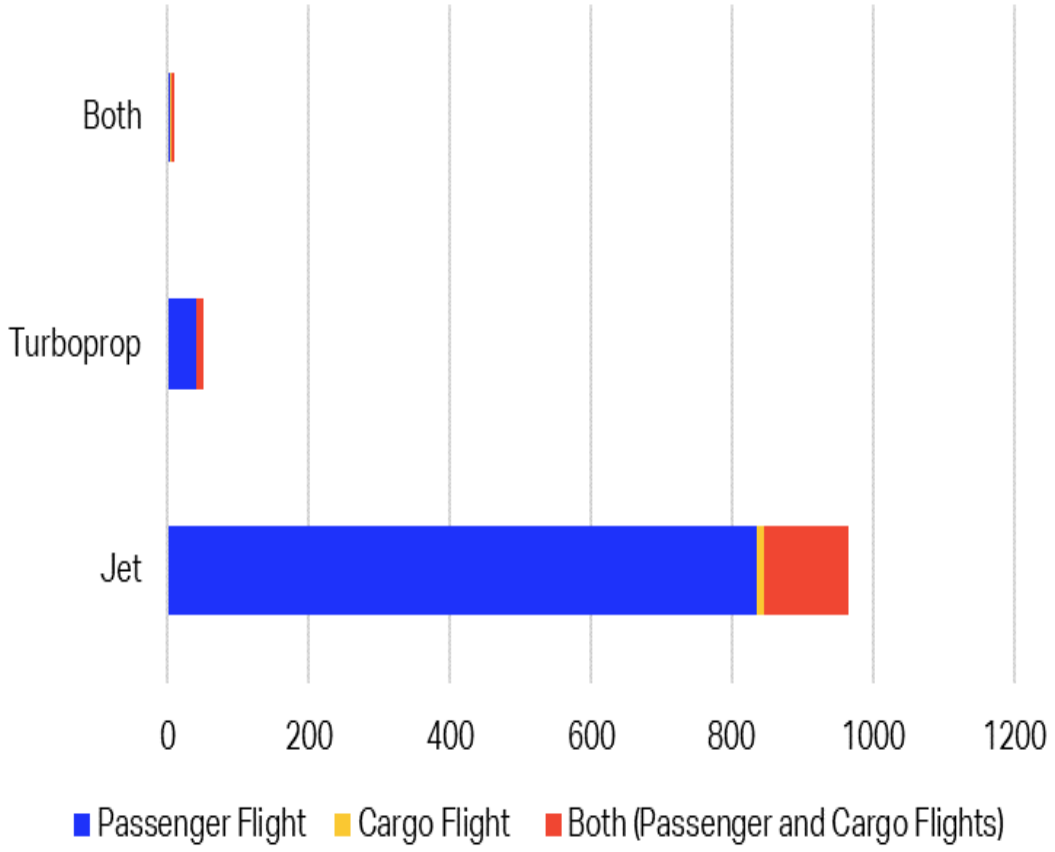
- Jet 965
- Turboprop 50
- Both 9



- **The aim of this question is to assess whether the survey respondents (1,024) are operating today on jet, turboprop or both. 94% of the respondents are operating Jet Flights**

Question 5: What aircraft propulsion type do you operate?

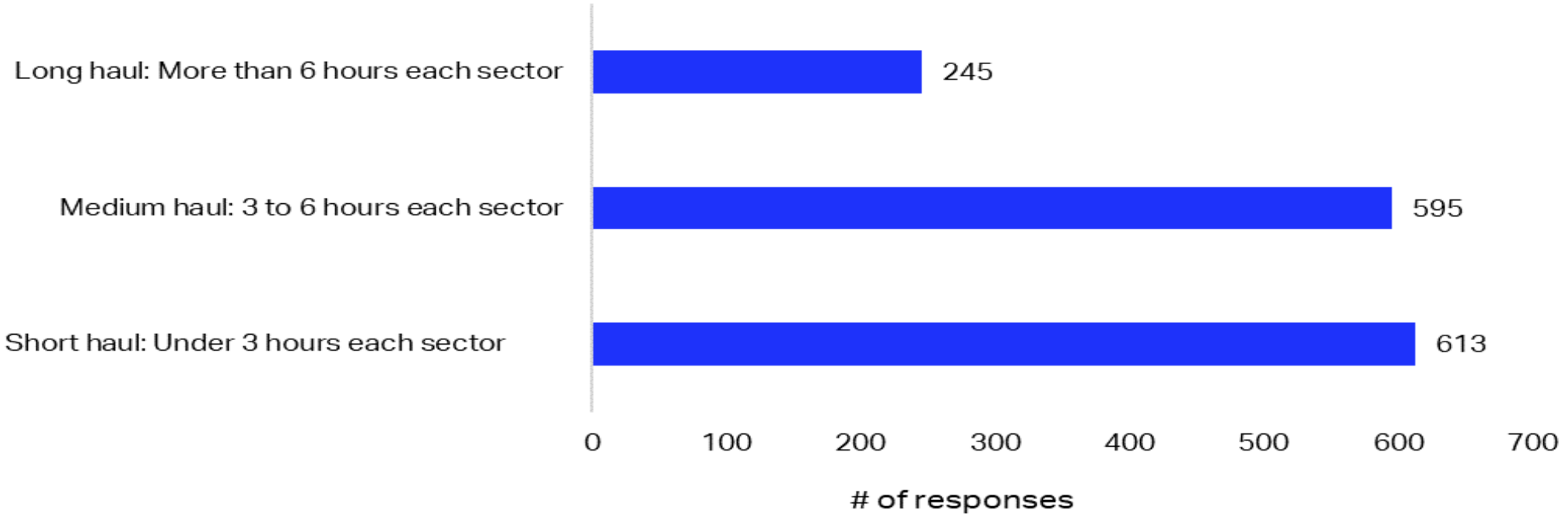




The majority of the respondents are captains, operating passenger flights on jet aircraft

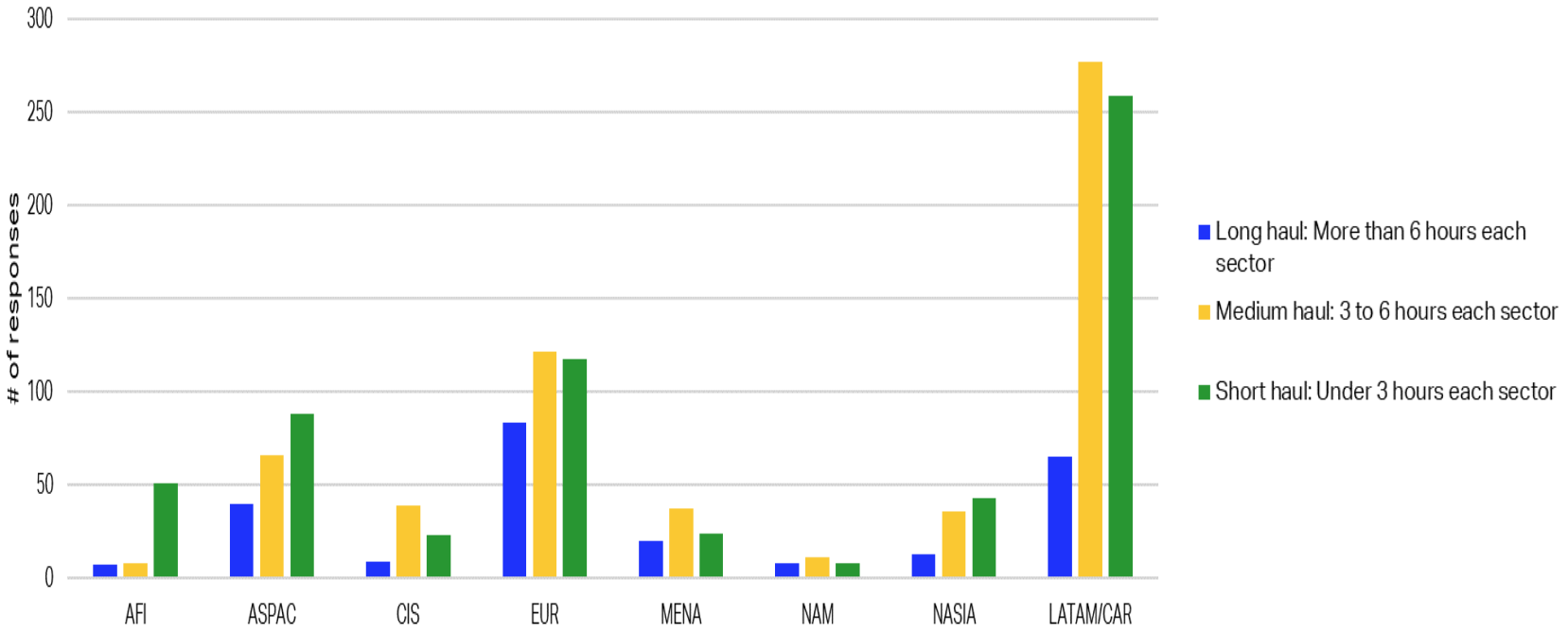
Question 6: What is your network?

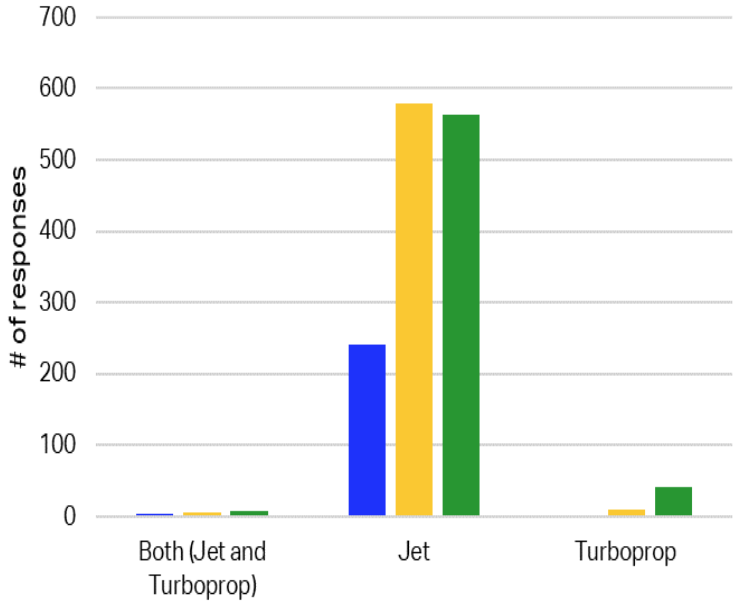
The results show that the respondents' selection of the short haul is slightly higher than the rest of the categories



* This question allows the participants to check more than one answer and hence the numbers are higher than the number of survey respondents. Percentages are not calculated in this question because the same participant was able to select more than one answer.

Question 6: What is your network?



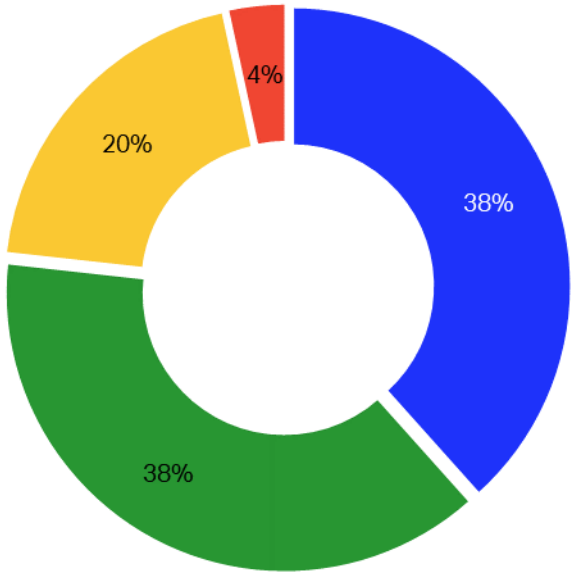


The results show that:

- **Short haul operation for respondents based in AFI, ASPAC and NASIA is higher than medium and long haul flights, whereas for CIS, LATAM/CAR, and MENA based respondents fly more medium haul flights than short and long haul flights. Short and long haul operations are equally the same for NAM and EUR based respondents**
- **Jet aircraft operates more on medium haul, followed by short haul, whereas turboprop aircraft operates more on short haul followed by medium haul**

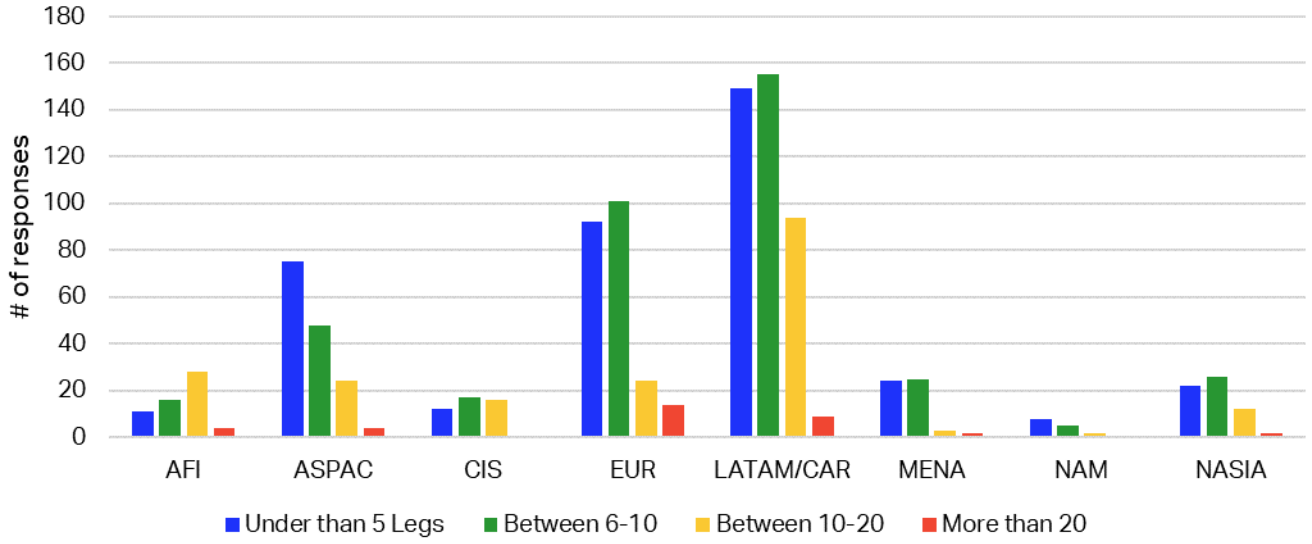
Question 7: How many legs do you fly in a typical duty week?

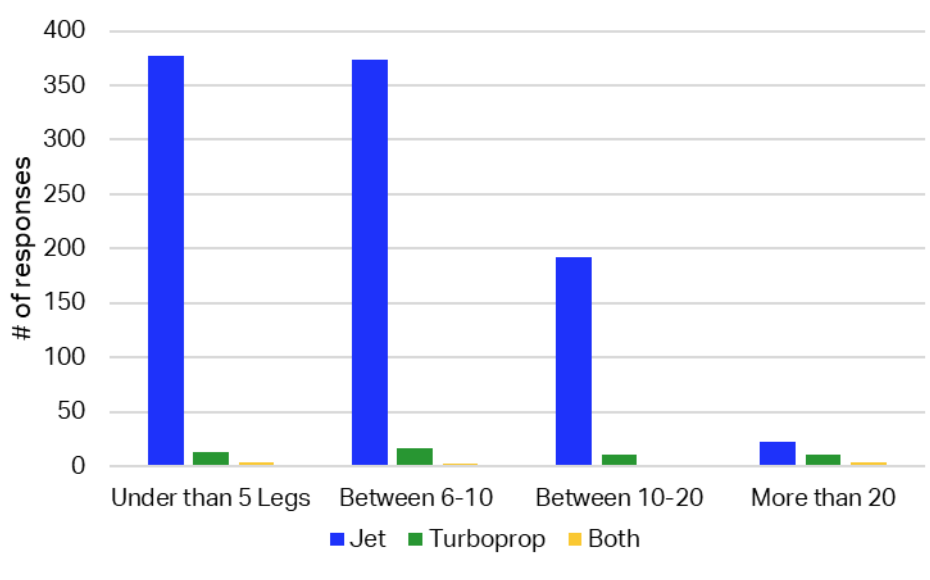
- Under than 5 legs 393
- Between 6 – 10 legs 393
- Between 10 – 20 legs 203
- More than 20 legs 35



Of the 1,024 responses, 38% responded that they fly less than 5 Legs in a typical duty week and 38% fly between 6-10 legs

Question 7: How many legs do you fly in a typical duty week?

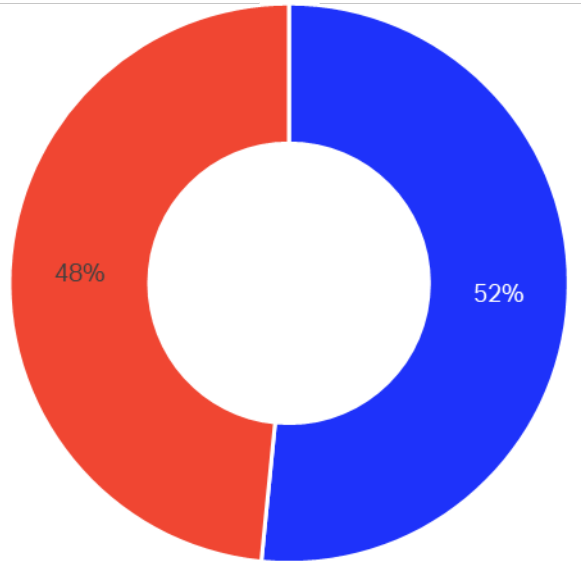




LATAM/CAR, CIS, NASIA and EUR based respondents fly between 6-10 legs in a typical duty week. AFI based respondents operate between 10-20 legs; whereas ASPAC and NAM fly less than 5 legs in a typical duty week

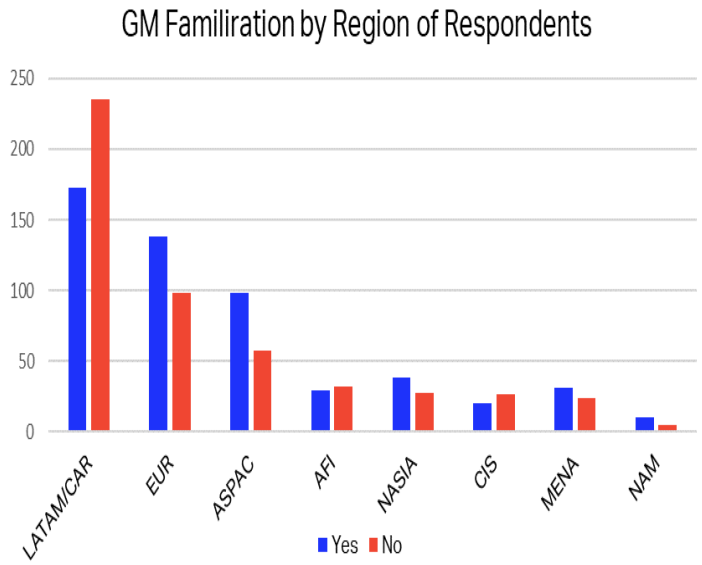
Question 8: Are you familiar with the 3rd edition of the Guidance Material (GM)

- Yes 537
- No 504



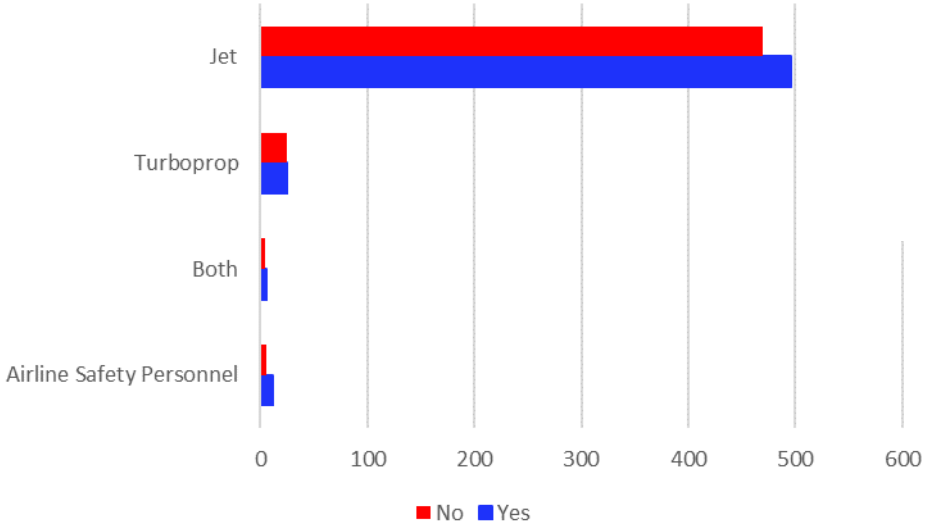
- **The purpose of this question is to know if the guidance material and the recommendations provided in the GM has reached Operators and Pilots. Of the 1,041 responses, 52% are familiar with the guidance material**
- **61% (307) of those who are not familiar with the GM, provided their email address to receive a copy of the GM**

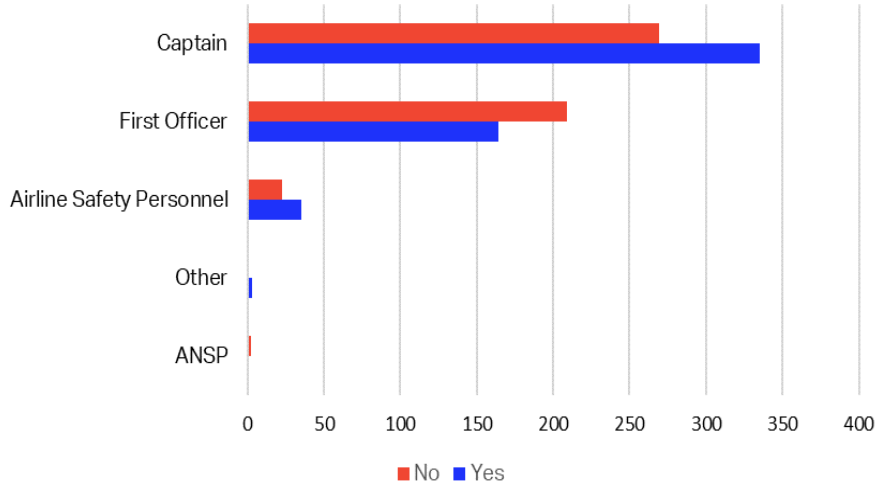
Question 8: Are you familiar with the 3rd edition of the Guidance Material (GM)



Respondents who are based in EUR, ASPAC, NASIA, MENA and NAM are more familiar with the GM than the rest of the regions

More than 50% of respondents who are operating on Jet aircraft are familiar with the GM



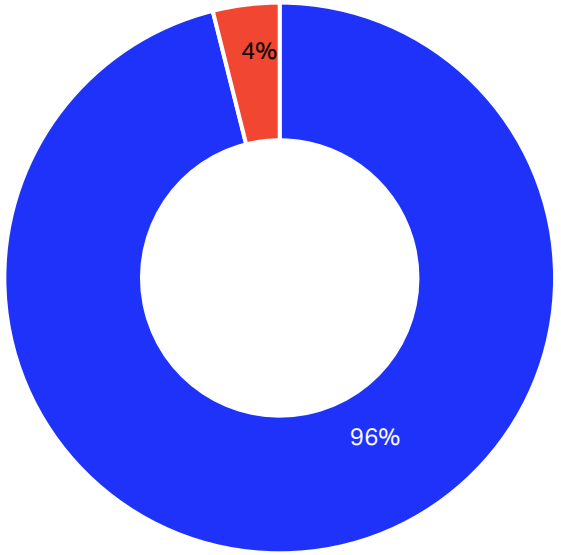


Captains and Airline Safety personnel are more familiar with the GM than First Officers

The respondents who are not familiar with the 3rd edition of the IATA/IFALPA/IFATCA and CANSO Guidance Material (GM) on "Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices will not be able to answer questions 10 to 14, thus the survey was arranged for those respondents to skip these questions and resume by answering question 15. So, the percentages for these questions are based on the 537 responses (who are familiar with the GM).

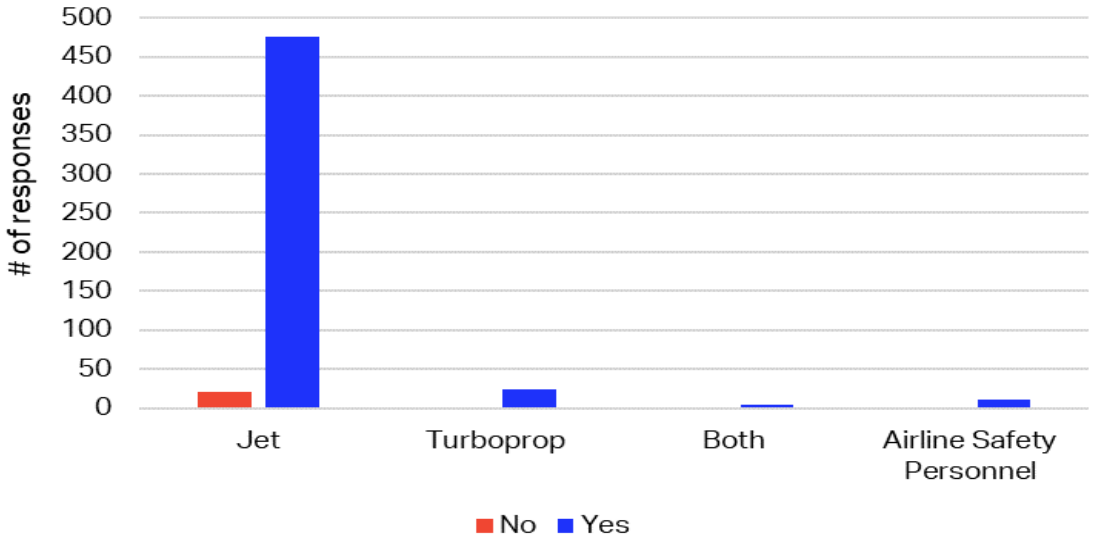
Question 10: The GM helped me to better understand the importance of stable approach criteria as critical elements of flight safety

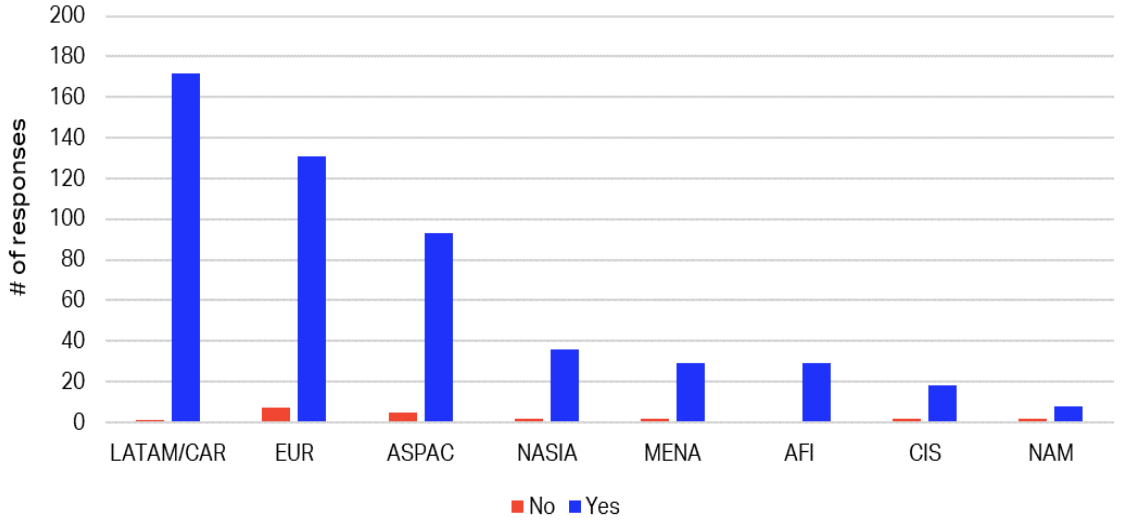
- Yes 516
- No 21



96% of the respondents who are familiar with the GM (537) agree that the GM helped them to better understand the importance of stable approach criteria as critical elements of flight safety

Question 10: The GM helped me to better understand the importance of stable approach criteria as critical elements of flight safety



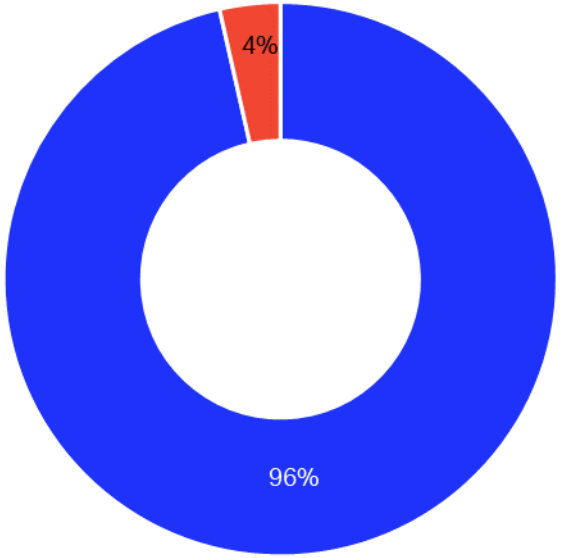


The GM helped most of the respondents who indicated that they are familiar with the GM, to better understand the importance of stable approach criteria as critical elements. Of the 25 Turboprop respondents, 96% confirmed that this GM helped them. All 11 flight Safety personnel confirmed same.

In this category, the GM helped all respondents across the globe but it is apparent that all respondents based in AFI found the document valuable and helped them to better understand the importance of stable approach criteria

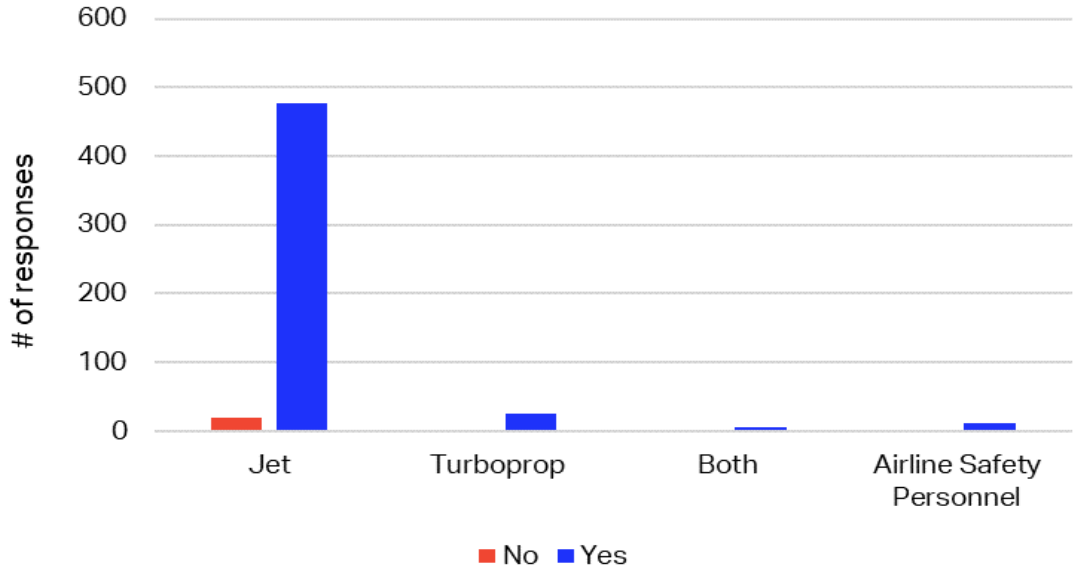
Question 11: The GM helped me to increase my awareness on the risks of UA

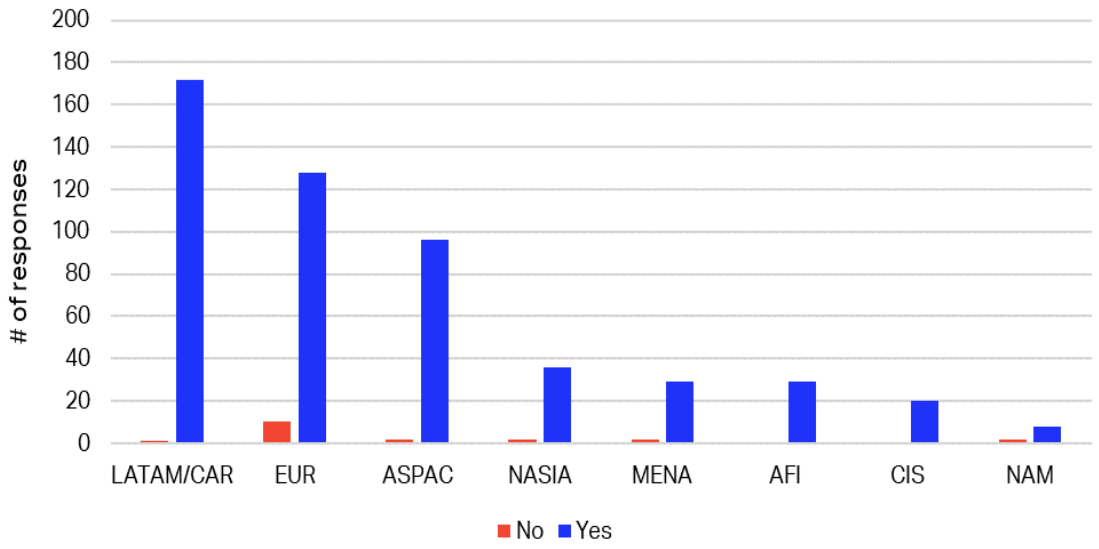
- Yes 518
- No 19



96% of the respondents who are familiar with the GM (537) agree that the GM helped them to increase my awareness on the risks of unstable approaches

Question 11: The GM helped me to increase my awareness on the risks of UA



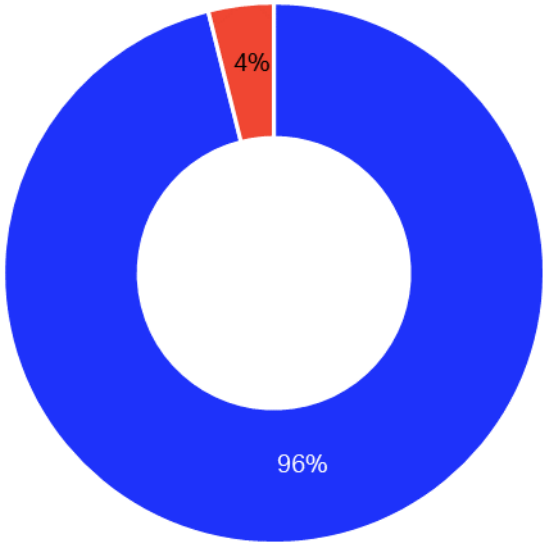


The GM helped most of the respondents who indicated that they are familiar with the GM to increase their awareness on the risks of UA. In this category, all respondents who operate on turboprop fleet and all airline safety personnel, confirmed that this GM increased their awareness on the risks of UA

In this category, the GM helped all respondents across the globe. All respondents based in AFI and CIS found the document useful and confirmed that this document increased their awareness on the risks of UA

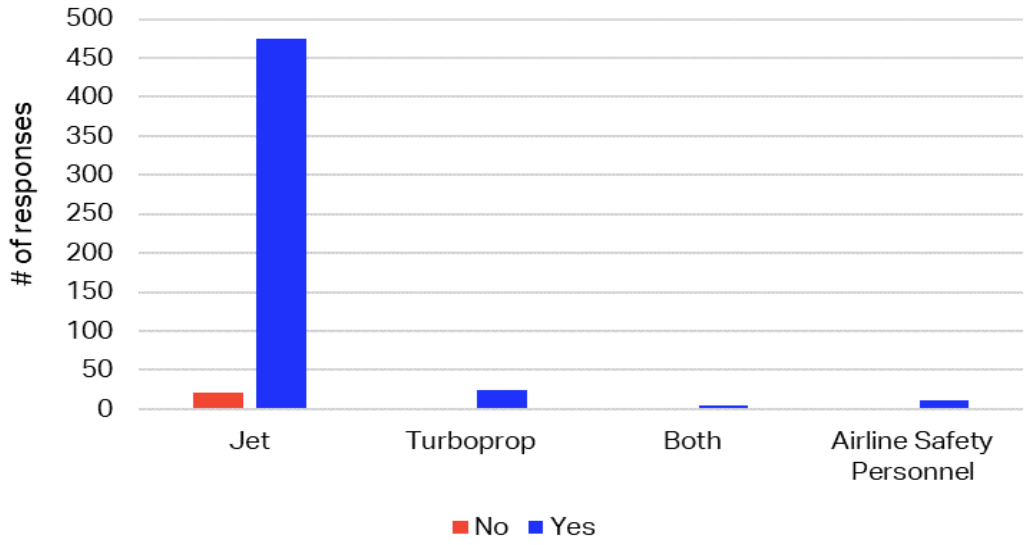
Question 12: The GM helped me to better understand the factors that lead to UA

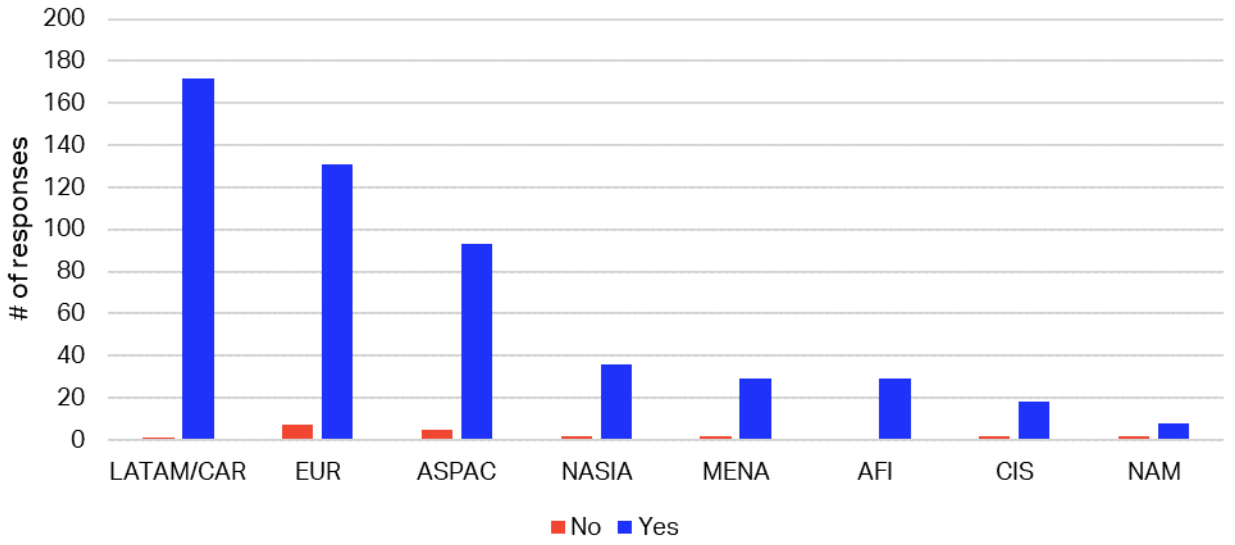
- Yes 516
- No 21



96% of the respondents who are familiar with the GM (537) agree that the GM helped them to better understand the factors that lead to unstable approaches

Question 12: The GM helped me to better understand the factors that lead to UA





The GM helped most of the respondents who indicated that they are familiar with the GM, to better understand the factors that lead to UA. All 25 Turboprop respondents, and all 11 flight Safety personnel confirmed that this GM helped them

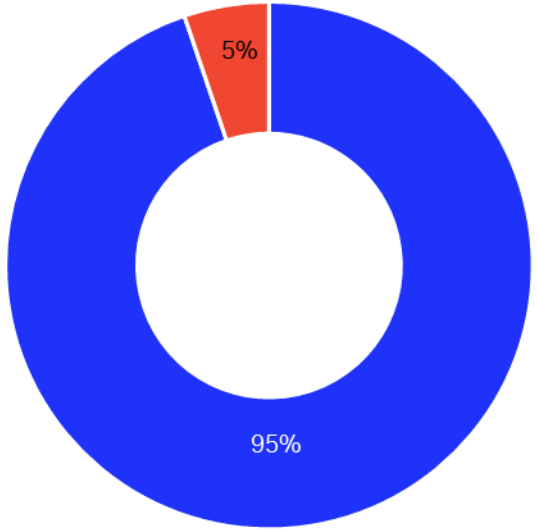
In this category, the GM helped all respondents based in AFI to better understand the factors that lead to UA

Insight: Questions 10, 11 & 12

- From the 21 negative responses who indicated that the GM did not help them to better understand the importance of stable approach criteria as critical elements of flight safety (Q10), 29% of them indicated that the GM helped them to increase awareness on the risks of UA (Q11)
- From the 518 who have indicated that the GM helped them to increase their awareness on the risks of UA (Q11), 1% indicated that GM did not help them to better understand the importance of stable approach criteria as critical elements of flight safety (Q10)
- From the 21 negative responses who indicated that the GM did not help them to better understand the factors that lead to UA (Q12), 38% helped them to increase their awareness on the risks of UA (Q11) and 24% helped them to better understand the importance of stable approach criteria as critical elements of flight safety (Q10)

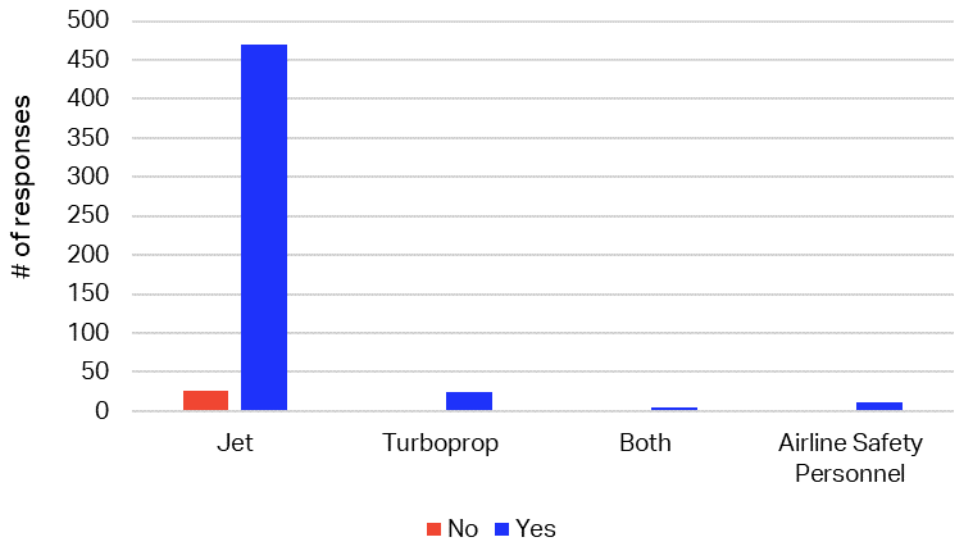
Question 13: In my organization, we have implemented practices from the GM to mitigate the risk of unstable approaches

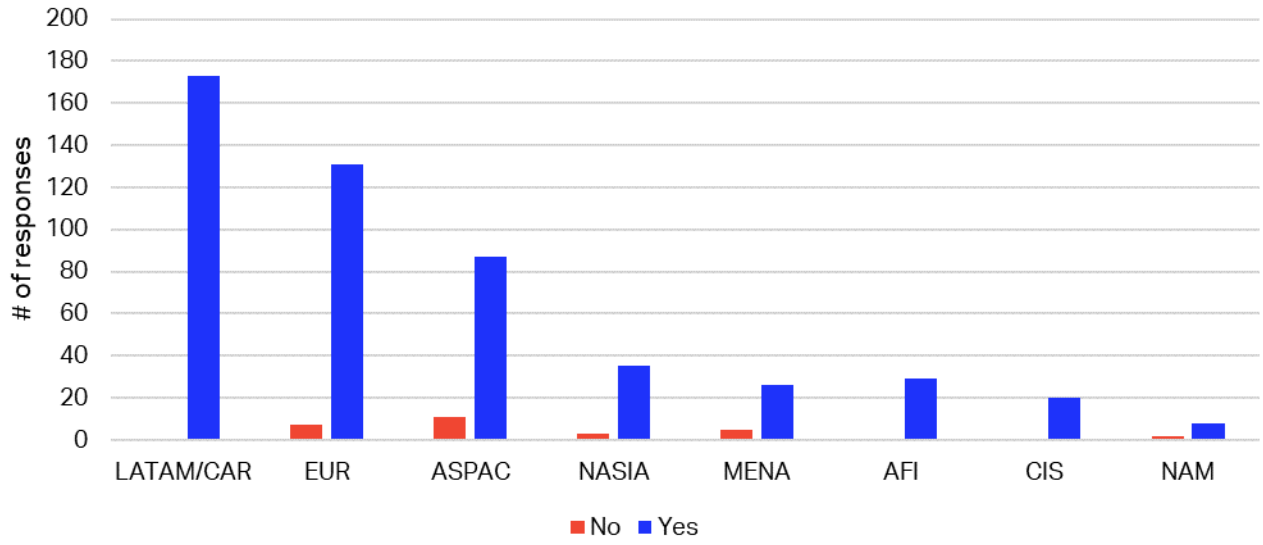
- Yes 509
- No 28



95% of the respondents who are familiar with the GM (537) implemented practices from the GM to mitigate the risk of unstable approaches

Question 13: In my organization, we have implemented practices from the GM to mitigate the risk of unstable approaches



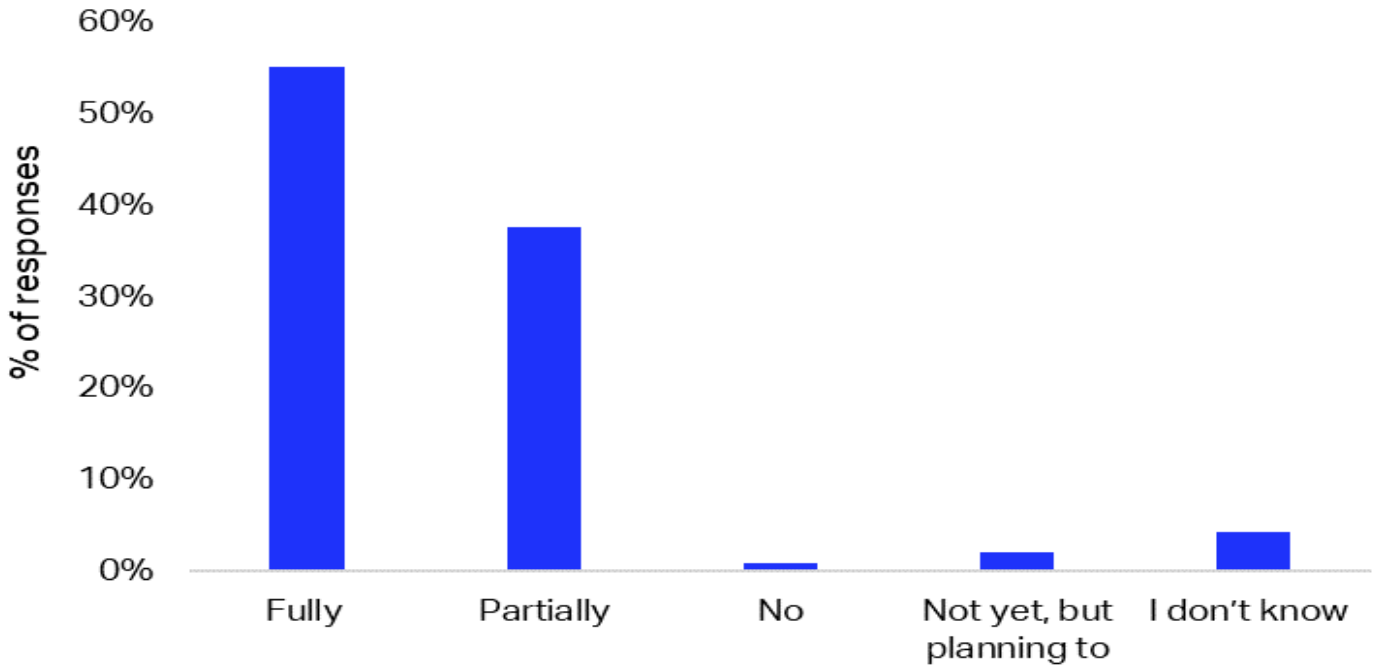


Most of the respondents who are familiar with the GM have indicated that their organizations have implemented practices from the GM to mitigate the risk of UA. All 11 airline safety personnel confirmed the implementation

In this category, all LATAM/CAR, AFI and CIS based respondents confirmed that their organizations have implemented practices from the GM

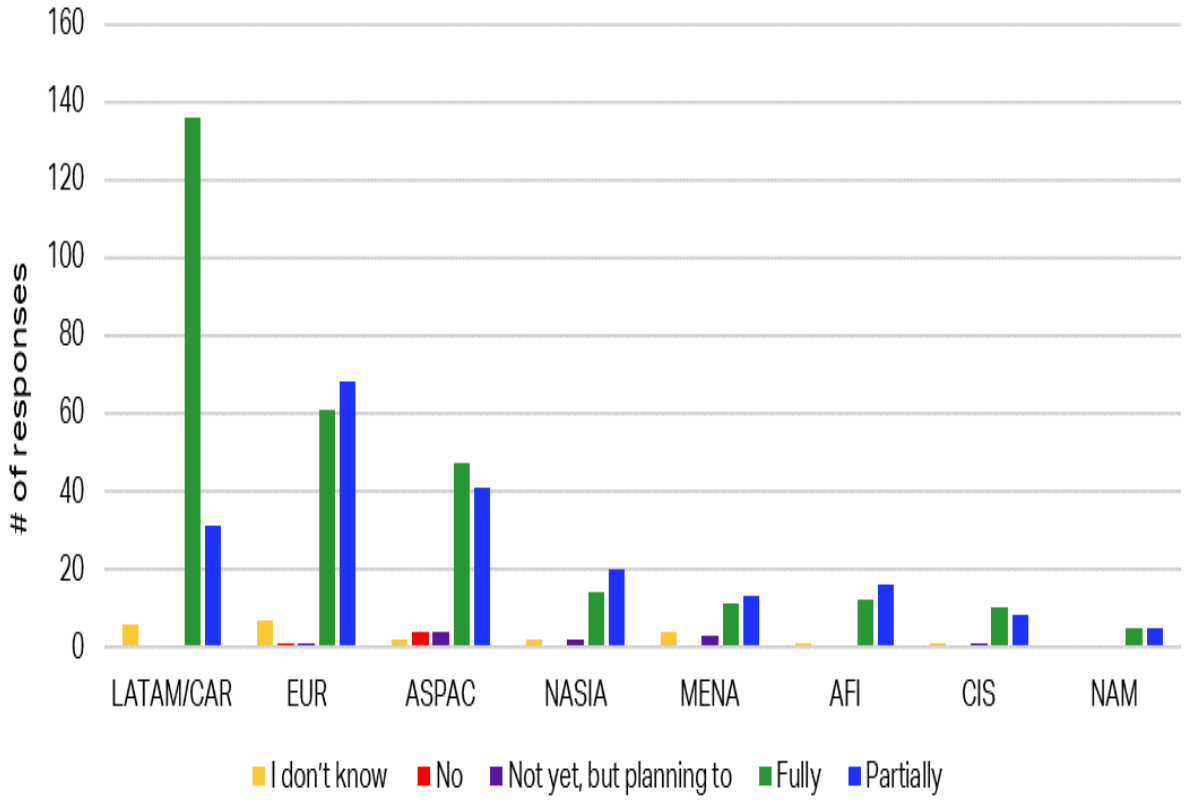
Question 14: In my organization, we have adopted the recommendations of the GM

- Fully 296
- Partially 202
- No 5
- Not yet, but planning to 11
- I don't know 23



55% of the respondents who are familiar with the GM (537) adopted the recommendations provided in the GM. Only 1% did not implement

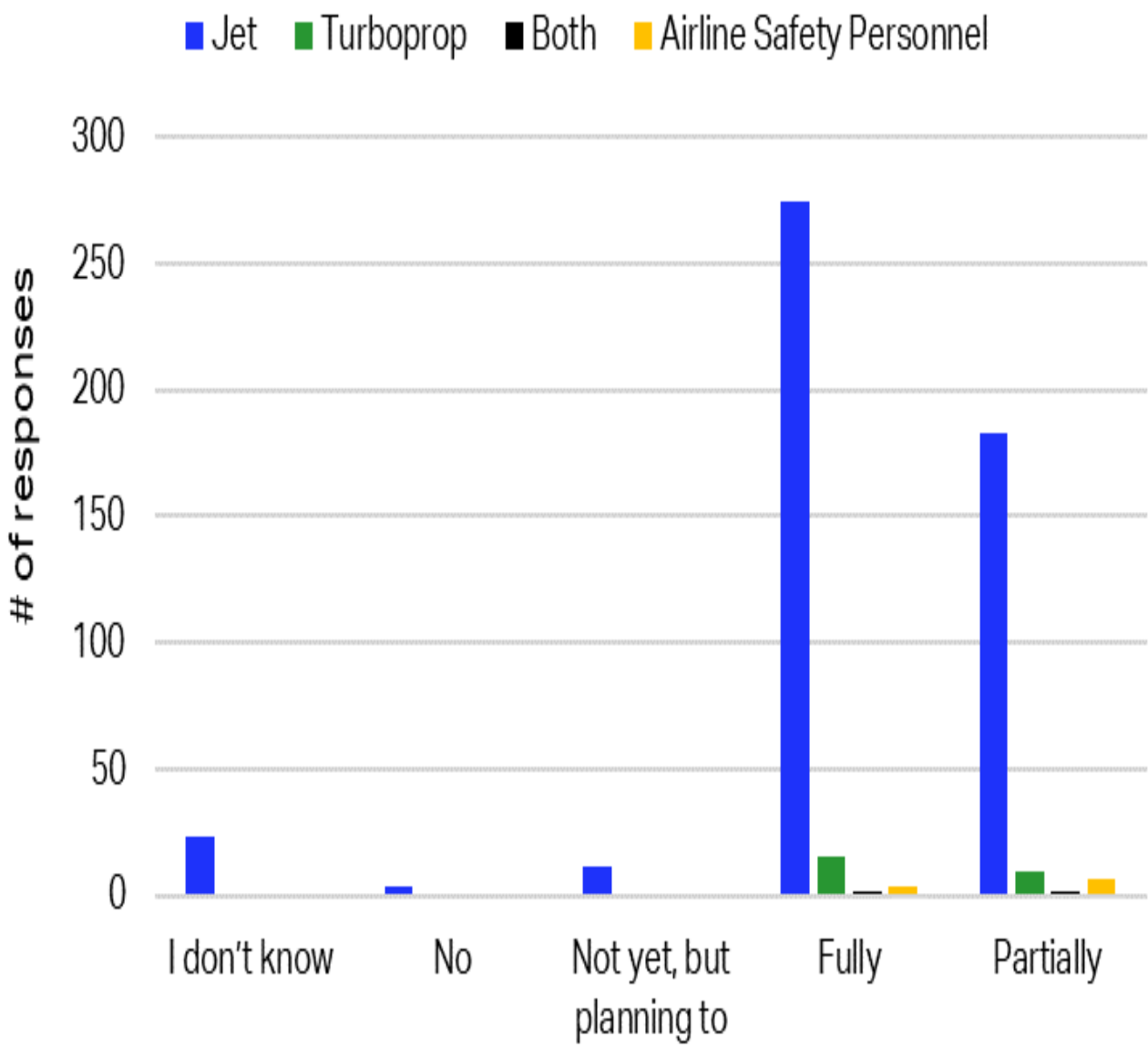
Question 14: In my organization, we have adopted the recommendations of the GM



Of those who are familiar with the GM, LATAM/CAR, CIS, and ASPAC based respondents have indicated that their organizations have fully adopted the recommendations. Whereas, EUR, NASIA, MENA, AFI based respondents indicated that their organizations have partially adopted the recommendations

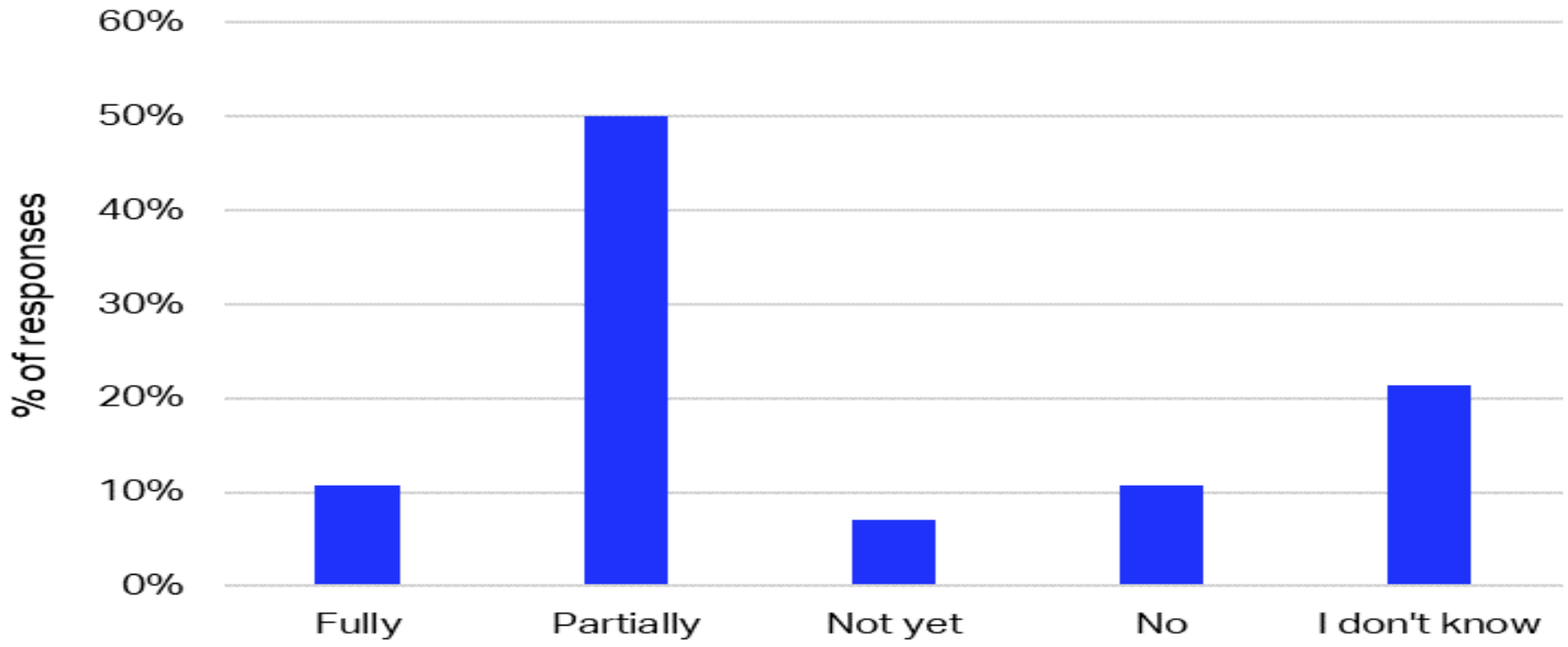
Question 14: In my organization, we have adopted the recommendations of the GM

All 11 Airline Safety Personnel and the 25 respondents who operate on turboprop indicated that their organizations have either fully or partially adopted the recommendations of the GM.



Insight: Questions 13 & 14

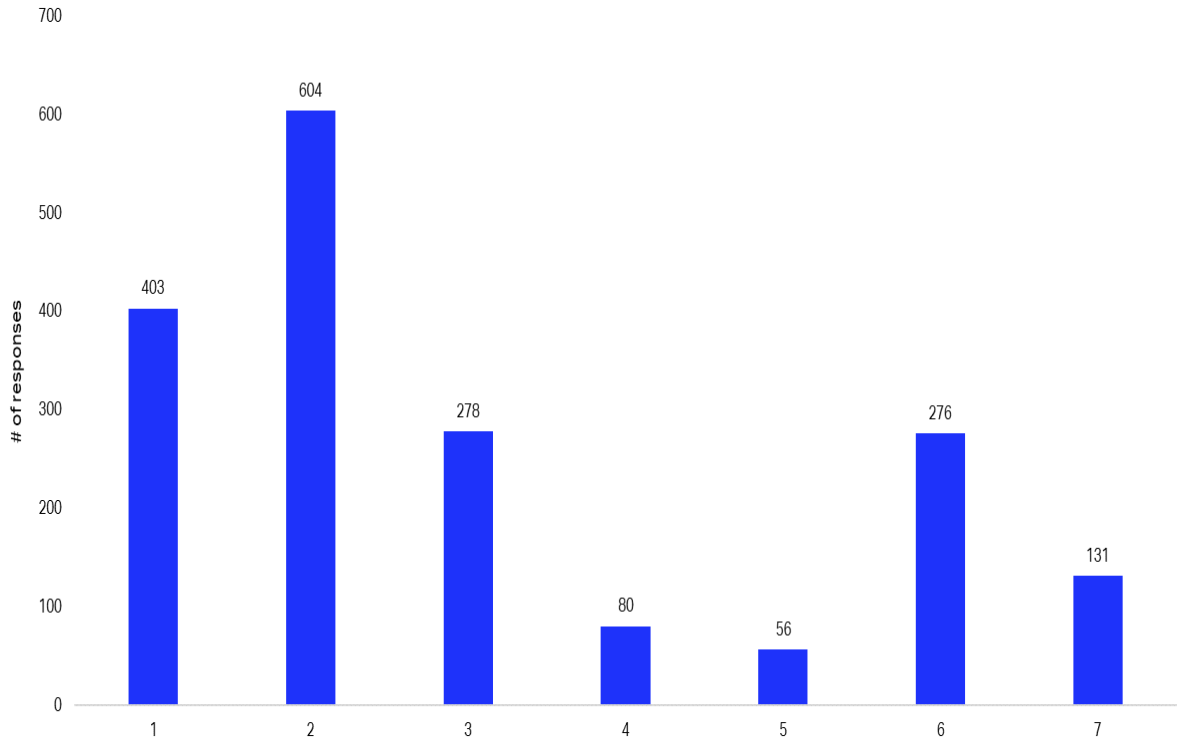
The 28 responses that have indicated that they have not adopted the recommendations provided in the GM, 50% of them have partially implemented it. Inspite11% (3) indicated that they have adopted the recommendations fully



Question 15: In my organization, what best practices do you follow regarding stable approaches?

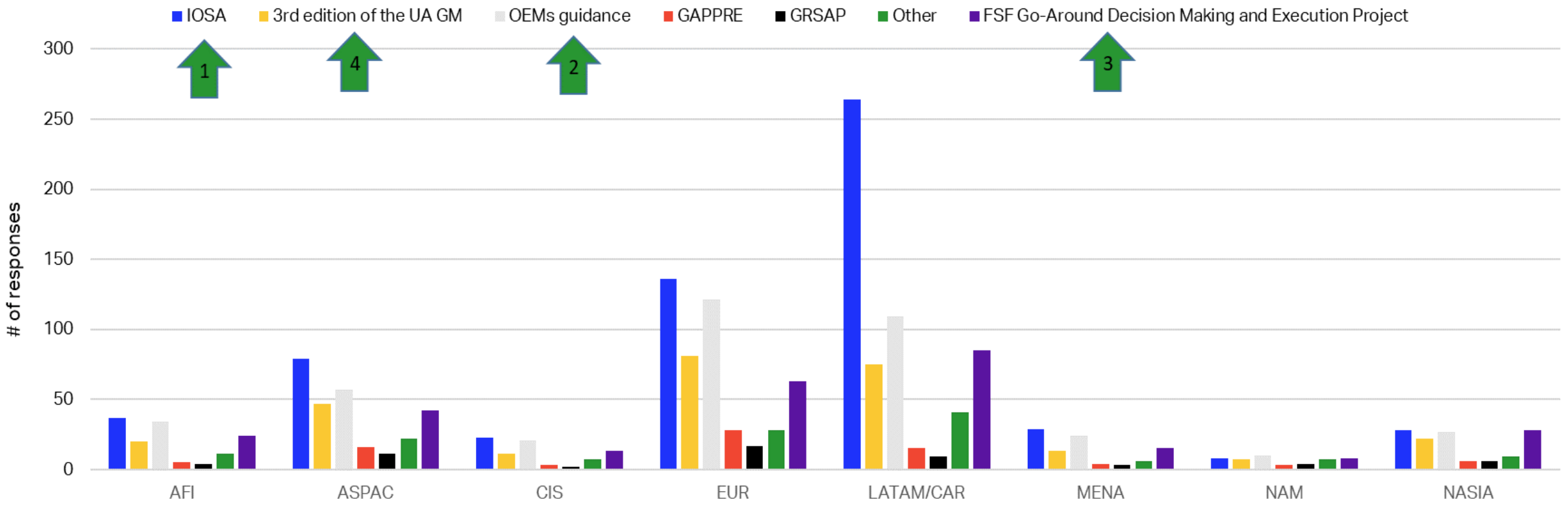
The results show that the respondents' selection of the IOSA SARPs is higher than the rest of the categories

1	OEMs guidance	403
2	IATA Operational Safety Audit Standards (IOSA)	604
3	Flight Safety Foundation Go-Around Decision Making and Execution Project	278
4	Global Action Plan for the Prevention of Runway Excursions (GAPPRE)	80
5	Global Runway Safety Action Plan (GRSAP)	56
6	3rd edition of the IATA/IFALPA/IFATCA/ CANSO Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices	276
7	Other	131



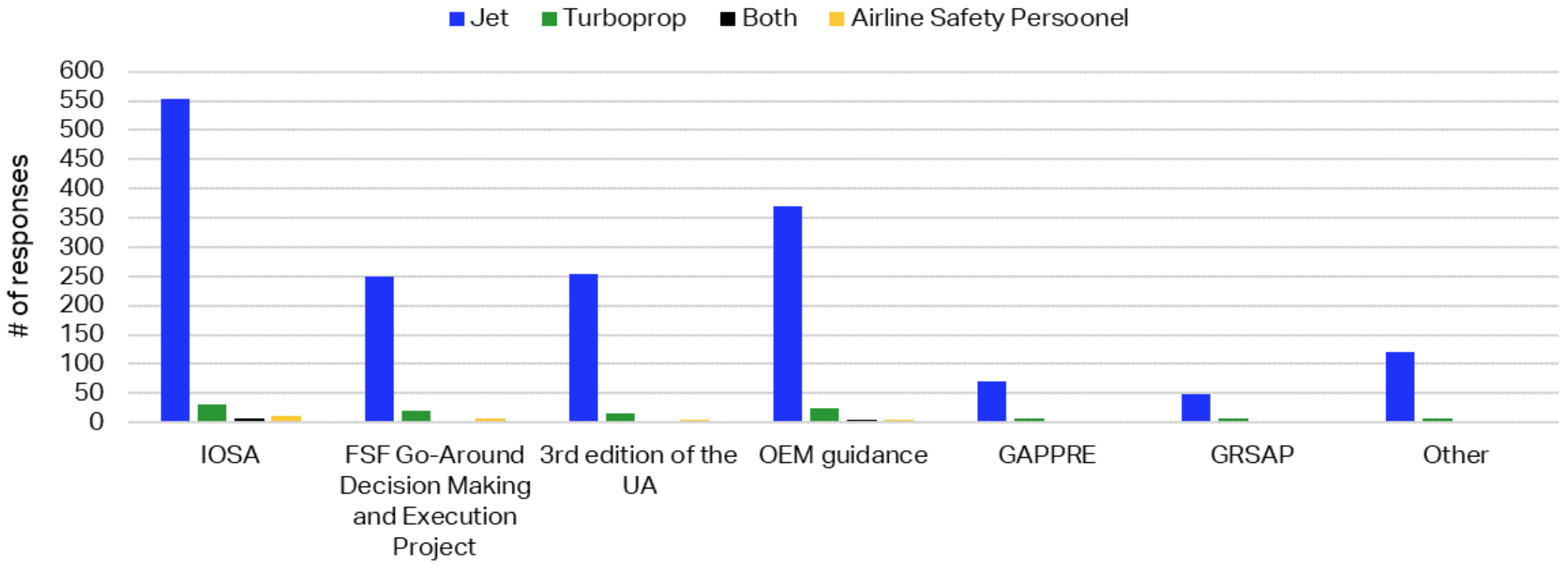
*** This question allows all participants to check more than one answer and hence the numbers are higher than the number of survey respondents. Percentages are not calculated in this question because the same participant was able to select more than one answer.**

Question 15: Regional Distribution, what best practices do you follow regarding stable approaches?



The highest selection was IOSA, followed by OEM guidance. The third and fourth best practices used are interchangeable between regions.

Question 15: What best practices do you follow regarding stable approaches?



Among the jet and turboprop respondents, IOSA was the highest selection, followed by OEM guidance.

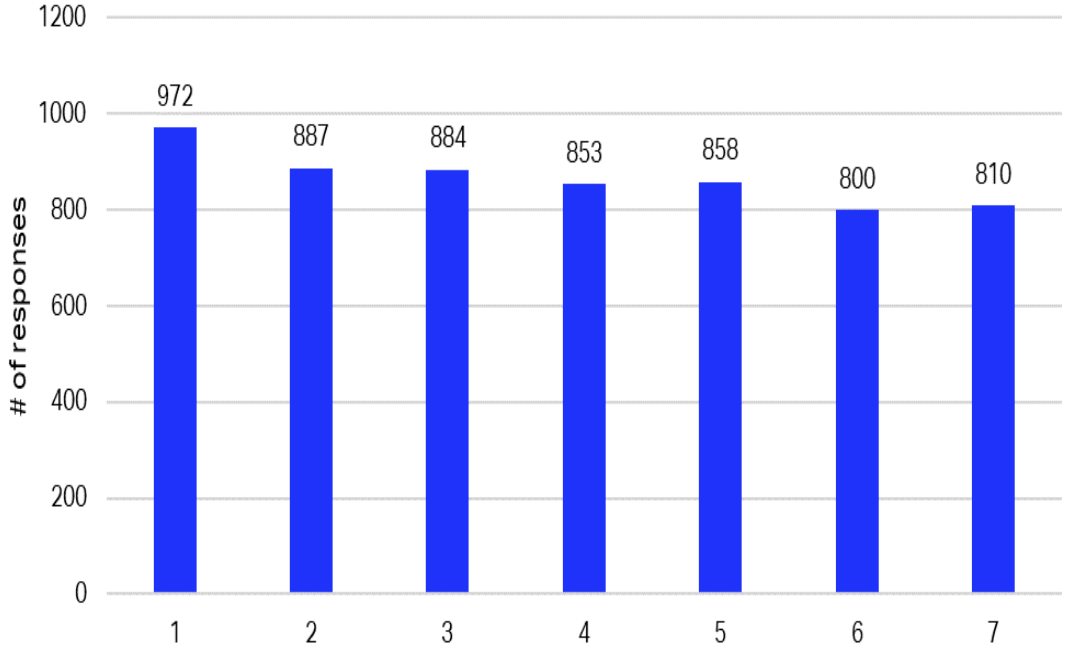
Question 16: If you selected "Other" in the previous question, please specify

- Company SOPs and Manuals
- Company SOPs and Manufacturer Operations Manuals
- Flight Crew Training Manual
- Federal Aviation Administration Advisory Circular – AC No. 91-79A;
- Federal Aviation Administration - Runway Excursions Support Tool;
- Doc 8168 PANS Aircraft Ops Vol 1 Flight Procedures,
- Flight Safety Foundation and ICAO
- Best practices resulting from Flight data collection/analysis and safety risk management activities
- ASIAS information, LOSA recommandations, A4A recommandations.
- Use of FOQA data directly to crew

Question 17: In my organization, we have clear and concise SOPs:

1)	Defines unstable approach criteria	972
2)	Supports go-around decision making process	887
3)	Promotes go-arounds in case of any doubt for the safe conduct of the final approach and landing	884
4)	Includes specific call out to formalize the status (stable or unstable) of the aircraft during the approach	853
5)	Includes adequate monitoring and cross-checking guidance to support crew co-ordination during approach and landing	858
6)	Requires effective and interactive briefings before each flight	800
7)	Emphasizes the importance of crew resource management	810

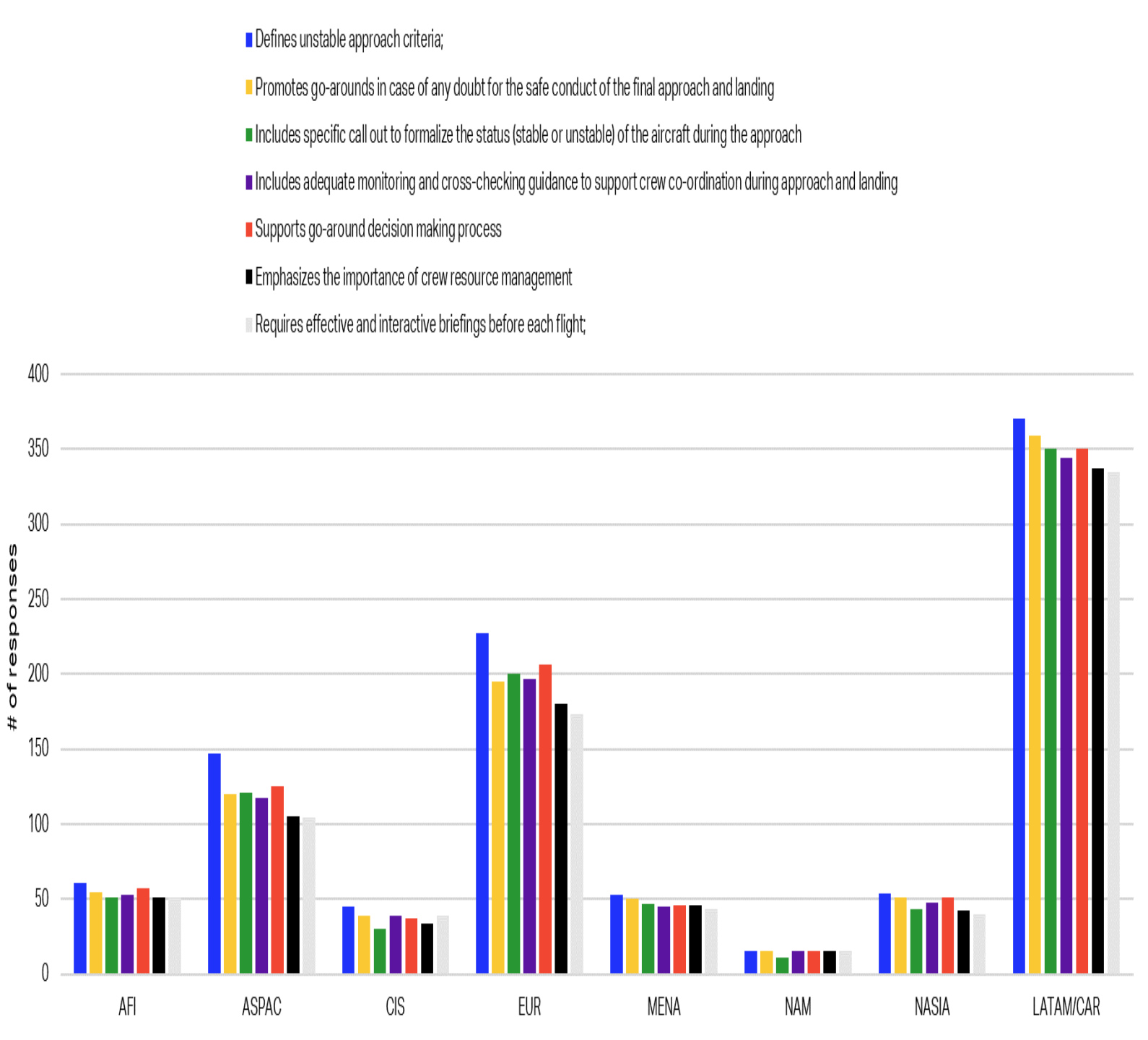
The respondents have indicated that in their organizations, they have a clear SOP that defines unstable approach criteria. This selection is highest among other categories

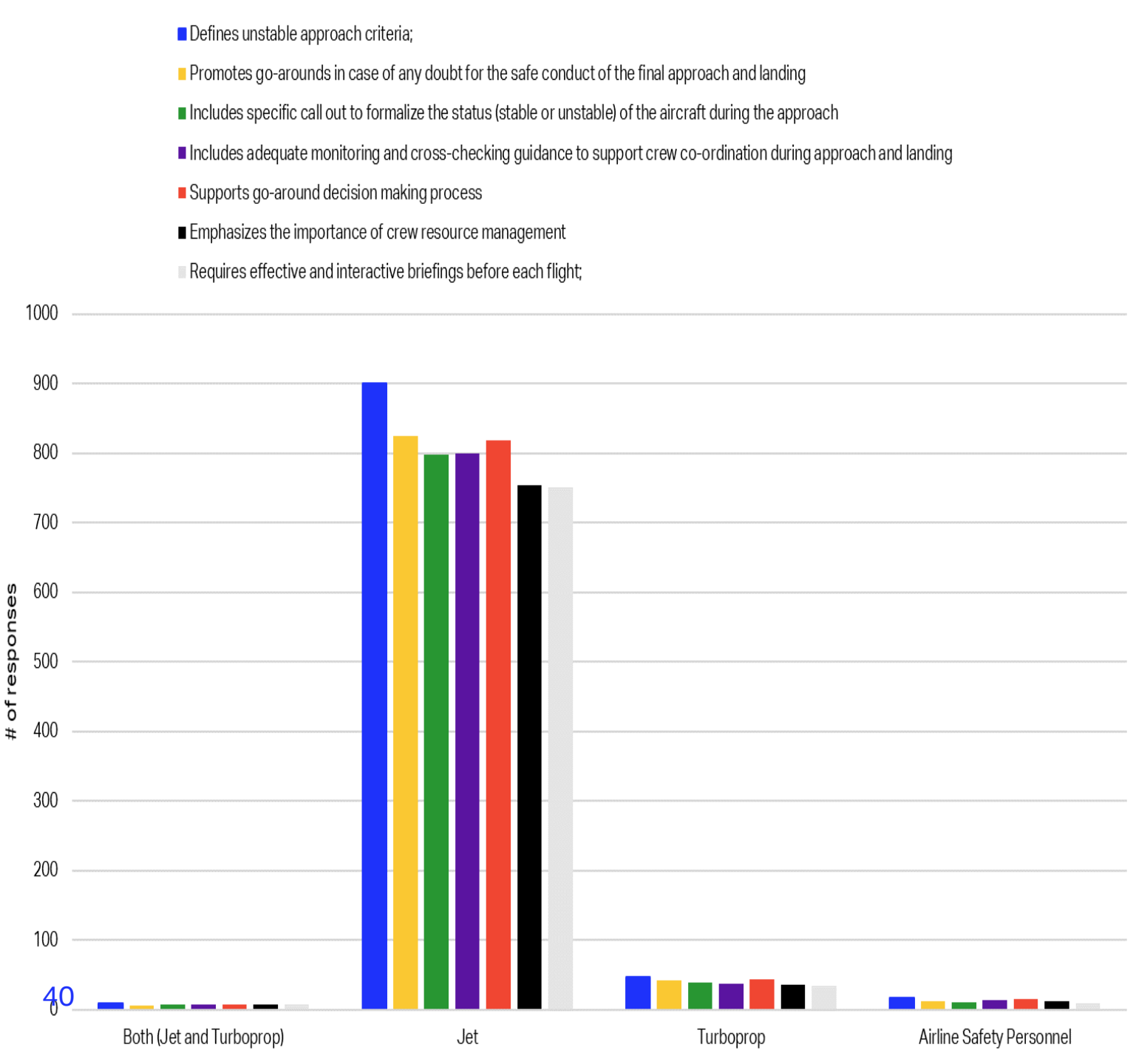


* This question allows all participants to check more than one answer and hence the numbers are higher than the number of survey respondents. Percentages are not calculated in this question because the same participant was able to select more than one answer.

Question 17: In my organization, we have clear and concise SOPs

All regions have clear and concise SOPs that define UA criteria as number 1. CIS, LATAM/CAR, and MENA, selected promotes go-around in case of any doubt as number 2; Whereas AFI, ASPAC, NASIA and EUR based respondents selected supports go-around decision making process as number 2. NAM selected all three categories equally



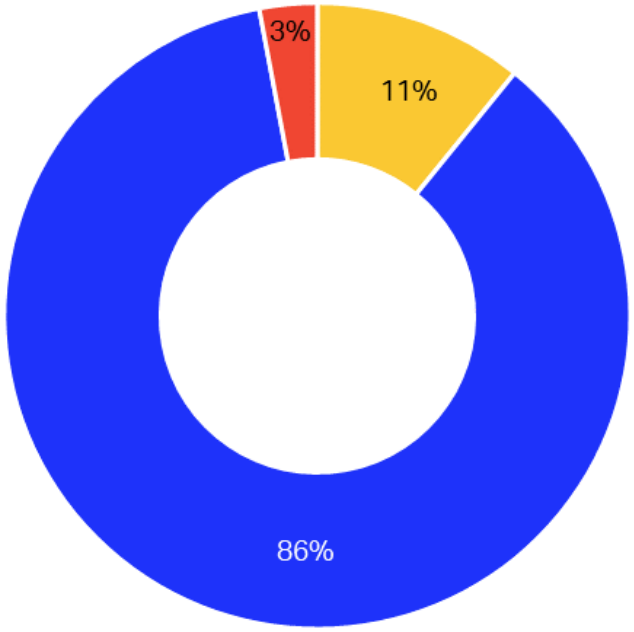


Question 17: In my organization, we have clear and concise SOPs

Jet and Turboprop respondents ranked defines UA criteria as number 1 and Jet respondents ranked promotes go-around in case of any doubt as number 2; Whereas Turboprop respondents and Airline Safety Personnel ranked defines UA criteria as number 1 and supports go-around decision making process as number 2

Question 18: In my organization, aircraft must be fully configured for landing at

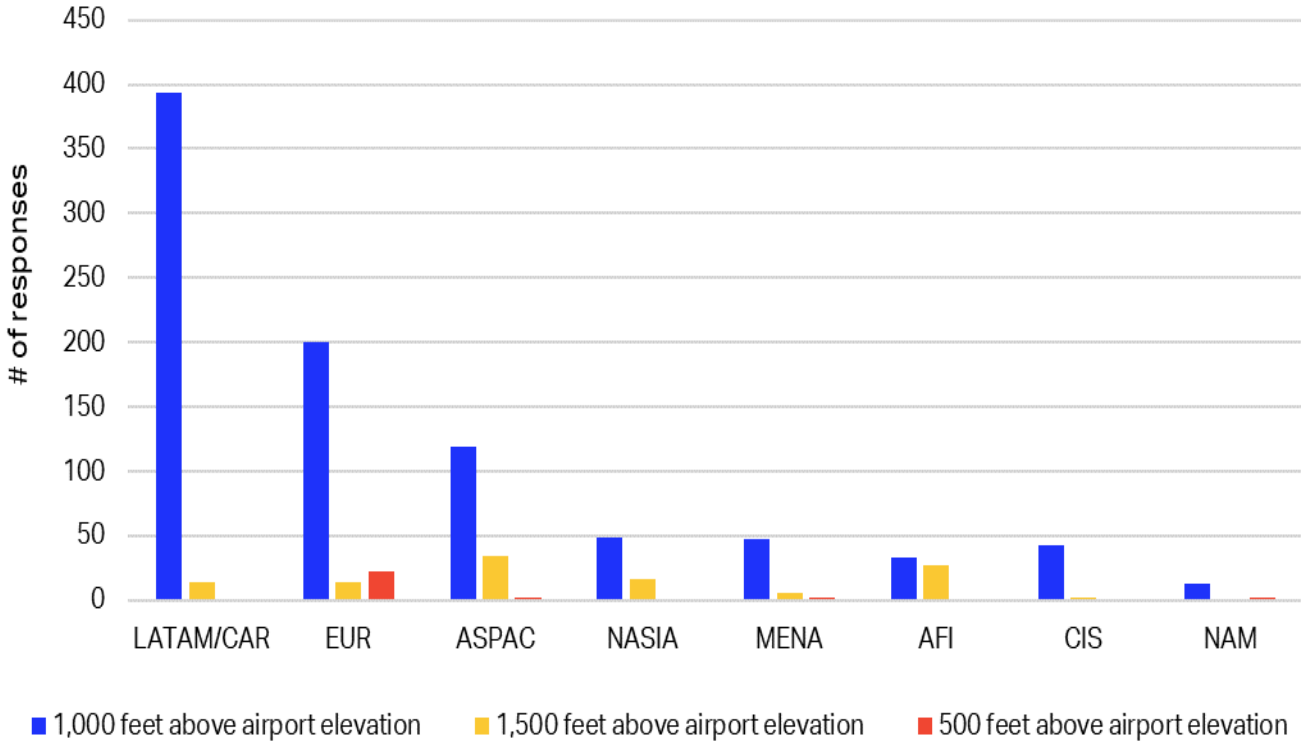
- 1,000 feet above airport elevation 897
- 1,500 feet above airport elevation 113
- 500 feet above airport elevation 31



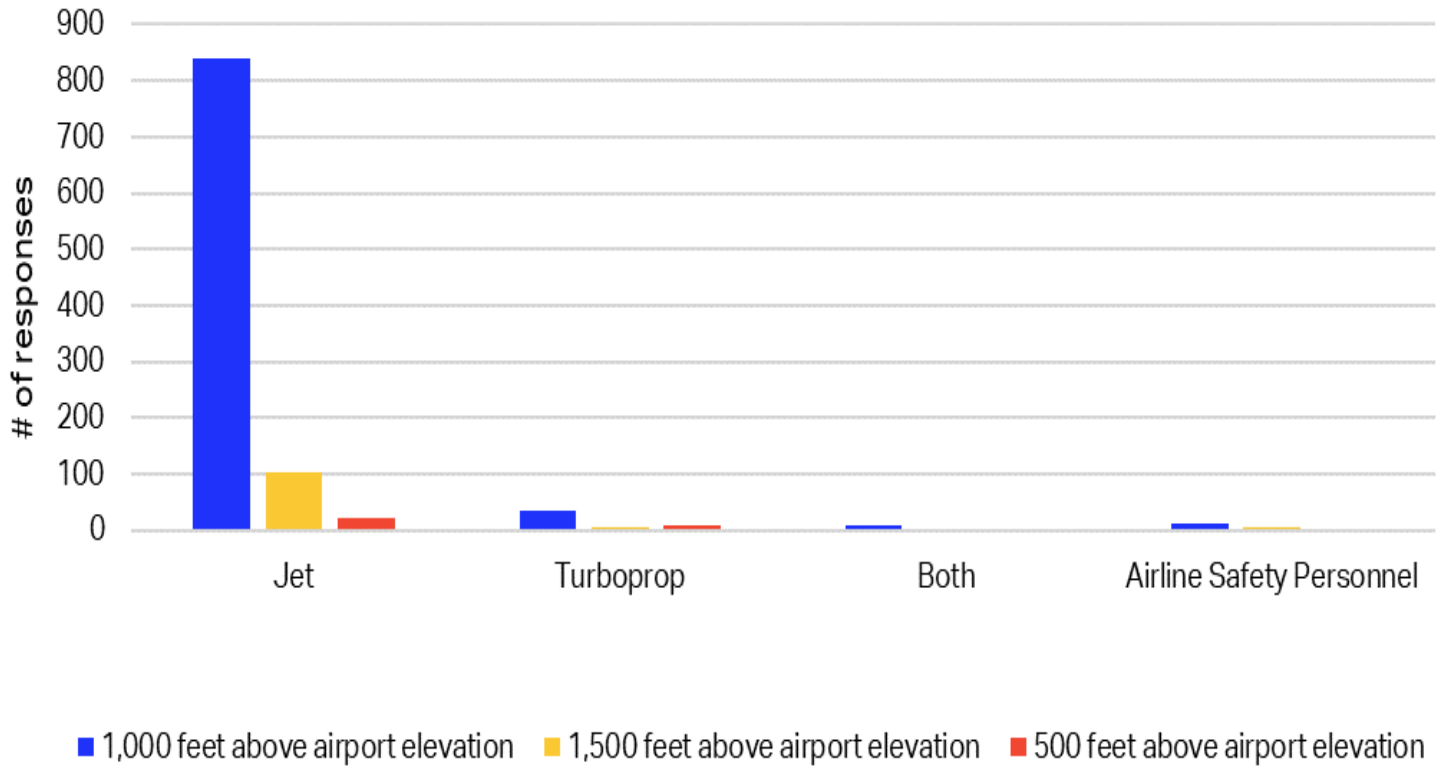
86% indicated that they must be fully configured for landing at 1,000 feet above airport elevation

Question 18: In my organization, aircraft must be fully configured for landing at

- **22% of ASPAC respondents indicated that their aircraft must be fully configured for landing at 1,500 feet above airport elevation, followed by AFI with 44%**
- **9% of EUR based respondents indicated that they must be fully configured for landing at 500 feet above airport elevation, followed by NAM with 13% and MENA with 4%**



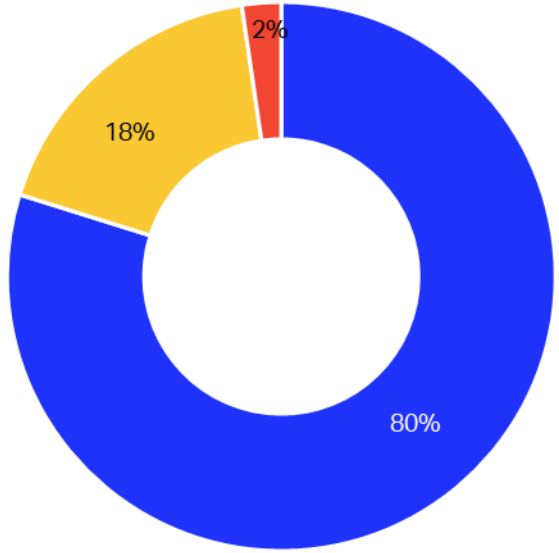
Question 18: In my organization, aircraft must be fully configured for landing at



- 2% of respondents who operate on Jets indicated that their aircraft must be fully configured for landing at 500 feet above airport elevation. 18% were from turboprop
- 11% of respondents who operate on Jets indicated that their aircraft must be fully configured for landing at 1,500 feet above airport elevation. 12% were from turboprop

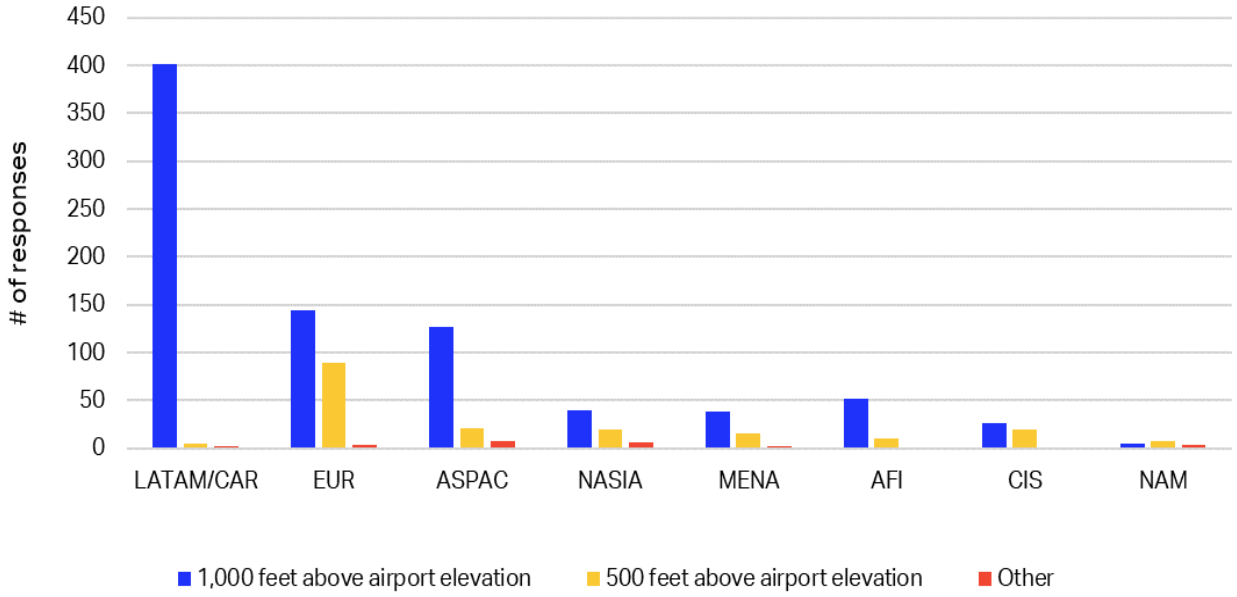
Question 19: In my organization, the minimum stabilization gate / height is:

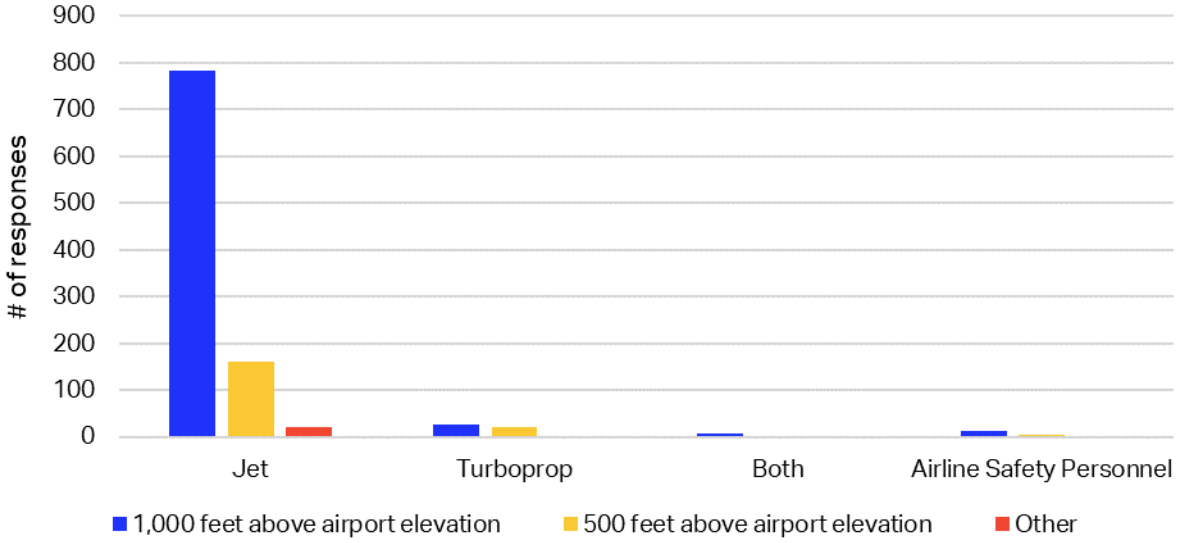
- 1,000 feet above airport elevation 831
- 500 feet above airport elevation 186
- Other 24



80% indicated that the minimum stabilization gate/height is at 1,000 feet above airport elevation

Question 19: In my organization, the minimum stabilization gate / height is:





The region with the highest responses when it comes to minimum stabilization height at 1,000 is LATAM/CAR with 48% feet. The region with the highest responses when it comes to minimum stabilization height at 500 feet is EUR with 48%

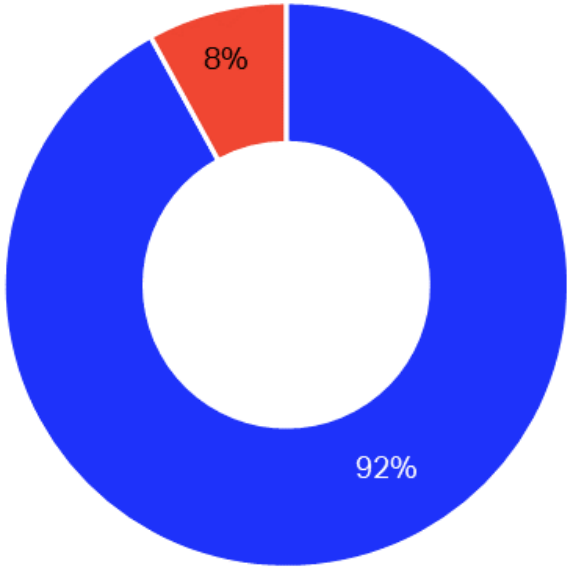
40% of responses who operate on turboprop indicated that the minimum stabilization gate is at 500 above airport elevation and 56% indicated that the minimum stabilization gate is at 1,000 feet

Question 20: If you selected "Other" in the previous question, please specify

- Depend instrument or visual
- before Final Approach Fix (FAF) (p)
- 1,800 ft AAL
- 1,500 ft AAL in fact way, this gate is greater than <Operation Manual> mentioned(1000ft AAL IMC &500ft AAL VMC). Any breaching will cause EVERY SEVERE penalty.
- 1,400 feet minimum
- 1,300 ft AGL
- 1,200 feet above airport elevation
- 1,000 ft AAL is the standard
- 500ft AAL for visual circuit
- 300ft AAL for circling or for special circle-to-land app.
- 200 feet Regarding the fully configured altitude in the previous question. At our airline it is a 'should' be configured at 1,000 feet. I can continue if in my judgement I will be fully stable by 500 feet. The goal is 1,000 feet configured and 500 feet fully stable. but if not, I can continue to correct minor factors up to 200 feet
- Although, the stabilization gate is 1000 feet AAL, we allow speed to be above Vapp +10 till 500 feet. This is mainly to cater for ATC speed control requirement

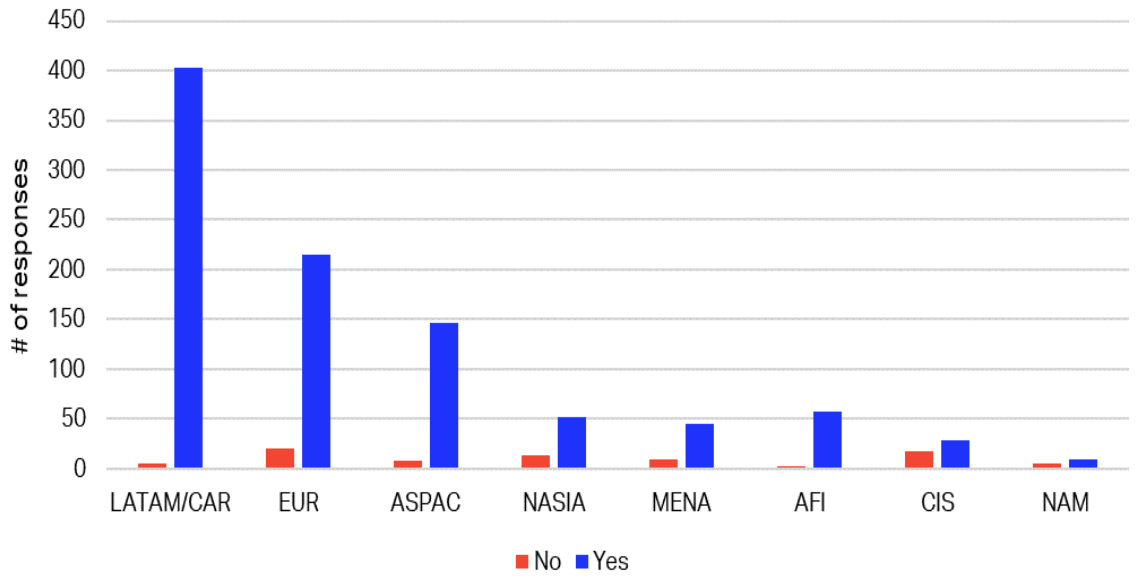
Question 21: Confirm if “Stable” or “Unstable” calls are practiced at the appropriate gate?

- Yes 958
- No 83

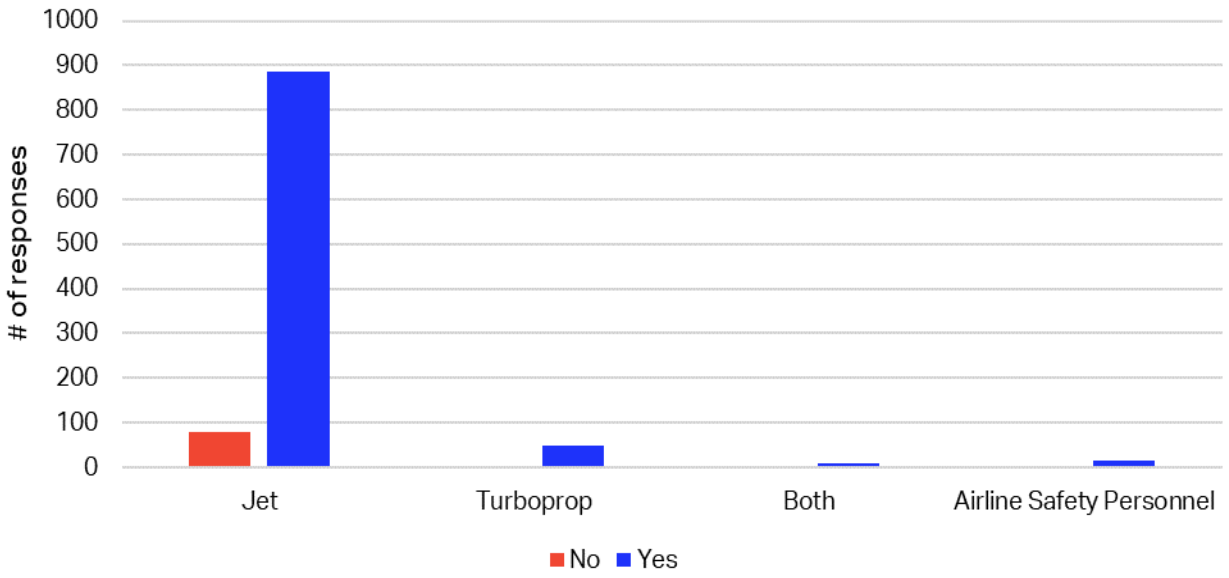


92% indicated that the “Stable” or “Unstable” Calls are practiced at the appropriate gate

Question 21: Confirm if “Stable” or “Unstable” calls are practiced at the appropriate gate?



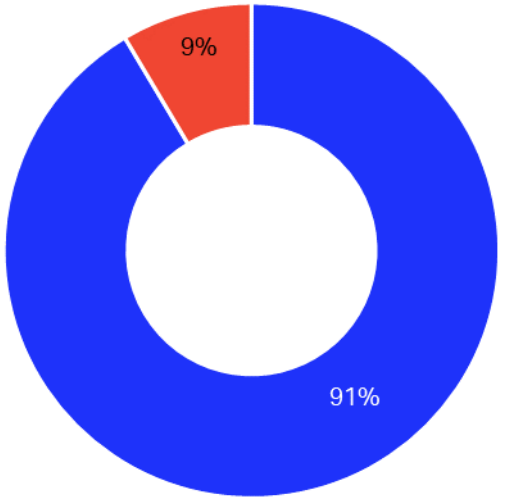
39% of all responses based in CIS do not practice “Stable” or “Unstable” calls at the appropriate gate. 33% of the responses based in NAM also do not practice such calls at the appropriate gate



8% of the responses who operate on jet fleet do not practice “Stable” or “Unstable” calls at the appropriate gate

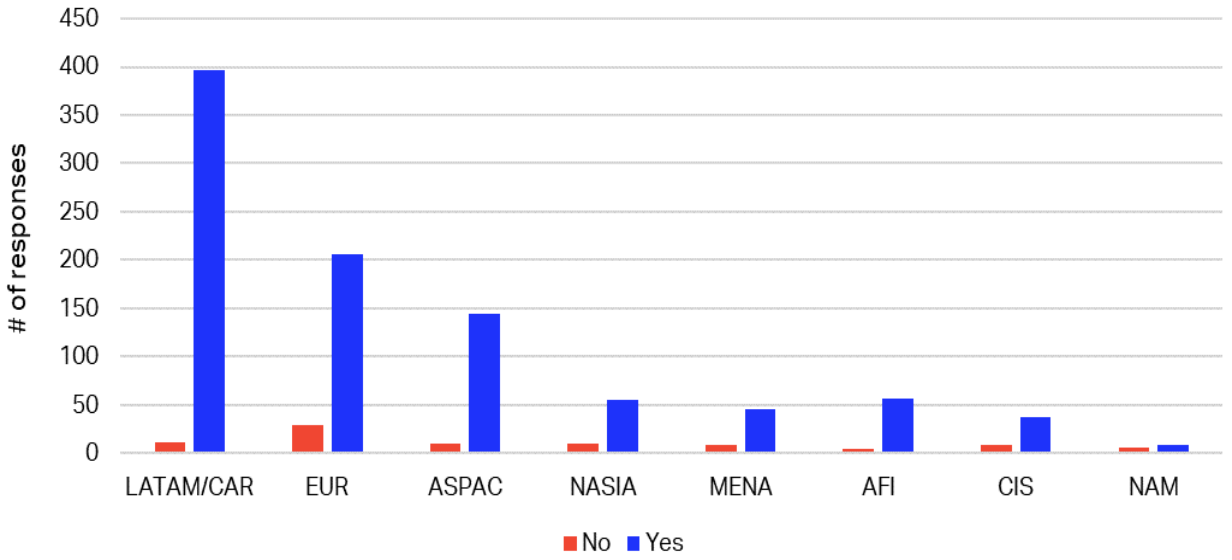
Question 22: If you answered "Yes" to the previous question, in your opinion, are those call outs executed appropriately?

- Yes 952
- No 89

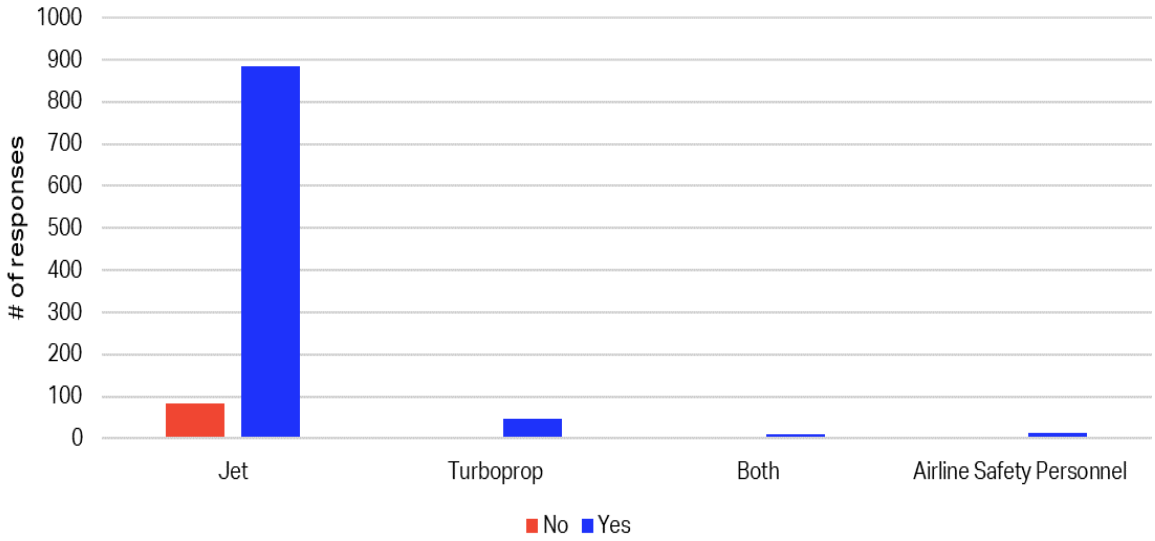


91% indicated that the “Stable” or “Unstable” Calls are practiced at the appropriate gate, they believe that the calls are executed appropriately

Question 22: If you answered "Yes" to the previous question, in your opinion, are those call outs executed appropriately?



13% of the responses based in EUR do not believe that these calls are executed appropriately



8% of the responses who operate on jet fleet do not believe that these call out are executed appropriately

Insight: Questions 21 & 22

- 95% of those who confirm that “Stable” or “Unstable” calls are practiced at the appropriate gate (Q21), they believe those callouts are executed appropriately (Q22)
- 51% of those who could not confirm if “Stable” or “Unstable” calls are practiced at the appropriate gate, believe those callouts are executed appropriately
- 5% of those who indicated that the Stable” or “Unstable” Calls are practiced at the appropriate gate, are not executed properly

Question 23: If you answered "No" to question 22, please elaborate why?

- On rare circumstances when the P1 ignores the P2's call.
- Familiarity between crews
- Because of peer pressure
- Some crews do not execute properly
- Due to a different language and a poor experience of a crew member.
- Mostly Human Factors /Human Performance reasons, workload management, lack of assertiveness, etc
- Crew base the callout on Radio Altimeter and not airport elevation.
- "Especially in *unstable* situation , sometimes deviation calls have been done instead of unstable call . PM might feel easier to make deviation calls than saying unstable ."
- The standard call includes only stable and continue approach
- We don't call stable or unstable, instead the pilot monitoring calls "go-around" if he/she sees an unstable condition
- Small corrections are allowed
- Some crews do not execute properly
- Confusion between operator SOP and Manufacturers standard call outs

Question 23: If you answered "No" to question 22, please elaborate why?

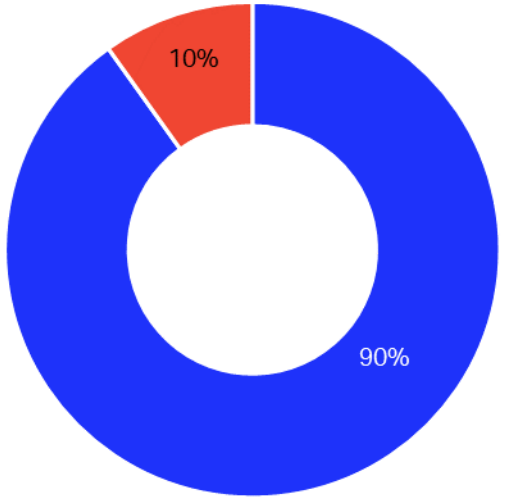
- If not stabilized at 1000' SOP is to go around. And any Pilot who is aware of the 'bust' must call for a go around
- Gate's Stable/Unstable calls are mandatory according to the company SOPs but occasional noncompliance experienced as an important contributing factor to poorly managed approaches and go arounds. This hazard is monitored on regular base: internal safety issues investigations, sim training
- It is not used this callout (unstable) in SOP, and not all pilots understand clearly what to do/follow
- Stable or non stable is not company call out
- It is always too busy on final to both control a B737 and call out "Stable" at the same time, when landing in bad weather. So maybe sometime, someone could just call out but not check.
- The element(s) that not meeting the stabilization criteria might be missed to recognize although the call-outs are executed at appropriate gate.
- Low situational awareness, Sometimes crew do not differ between RA and AAL. Sometimes visual contact with RWY tempt the crew from watching instruments

Question 23: If you answered "No" to question 22, please elaborate why?

- "The call" is based on 1000 ft above airfield elevation…. This Gate (call) is often missed, at higher elevation airfields … (the majority of our destinations are very close to sea level….) The " catch -all " for me , seems to be (" 1000 ft Radio …) … I understand how "1000 Radio" is not an ideal position to be stabilized by in quite many airports with undulating profiles of terrain on the approach. The 1000 ft Call (above airport Elevation) needs to be highlighted more in the Approach Briefing. Verbalized / Highlighted in Briefing as "WXYZ FEET AGL….."
- Operating on long and dry runways, sometimes if only the speed is above Vap, we tend to let the criteria of 1000ft get a lit bit down
- Sometimes speed is not within the stabilized criteria by 1000' AAL, but if requested by ATC then we can continue the approach. On the other hand, if not requested by ATC, we should go around. Same real condition with different actions to be taken. May be ATC should also meet and help stabilization criteria for every traffic, or operators and manufacturers work together in similar or equal procedures to apply
- People are not satisfied with the Stabilized Approach Concept

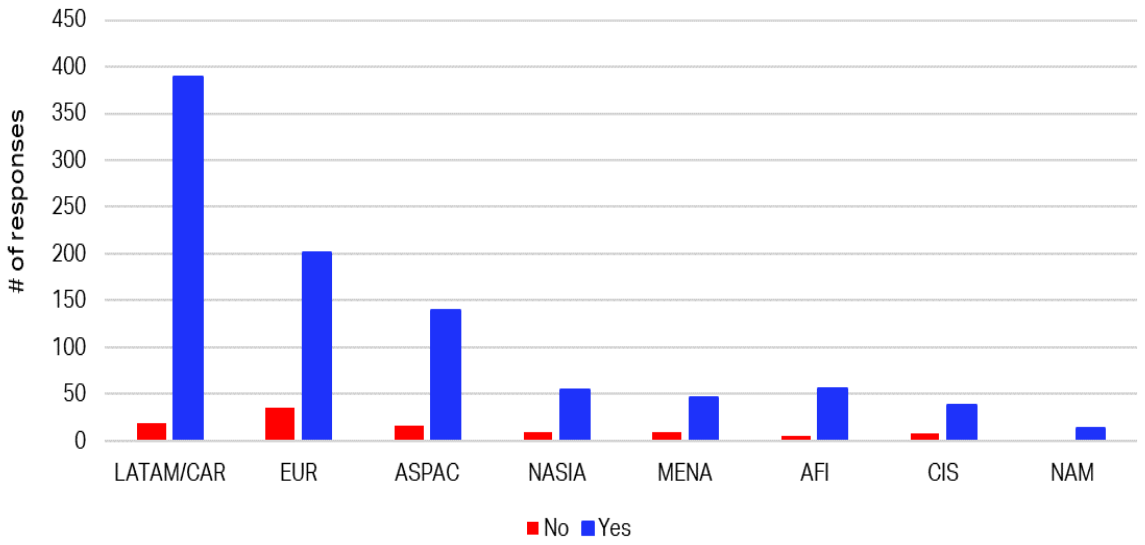
Question 24: Does your airline SOP contain any formal callout to trigger a go-around in case of destabilization below the stabilization gate?

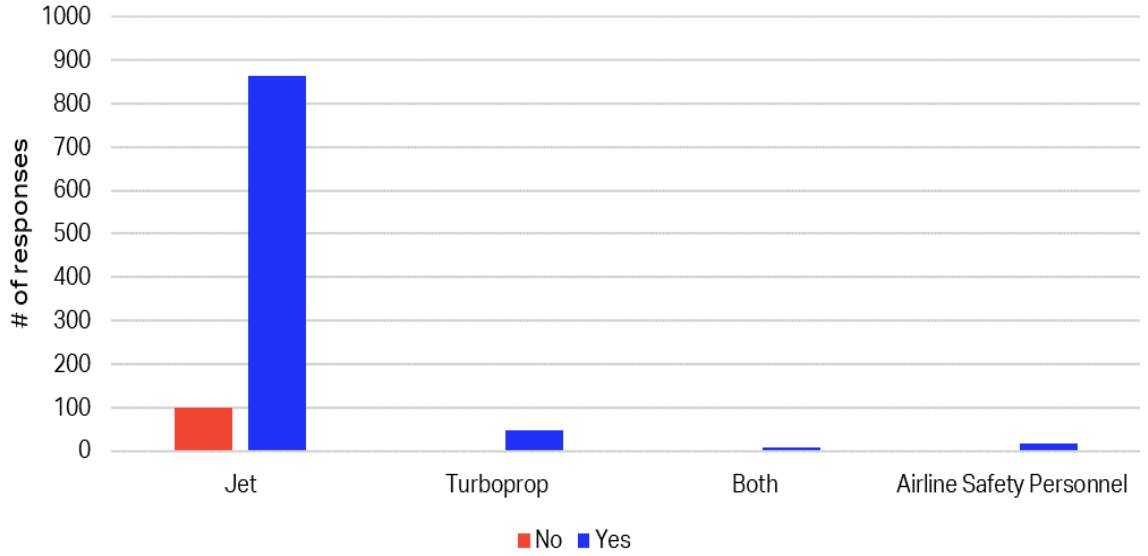
- Yes 938
- No 103



90% indicated that their SOPs contain formal callouts to trigger a go-around in case of destabilization below the stabilization gate

Question 24: Does your airline SOP contain any formal callout to trigger a go-around in case of destabilization below the stabilization gate?





17% of the responses based in CIS indicated their SOPs do not contain any formal callout to trigger a go-around in case of destabilization below the stabilization gate. This is followed by MENA with 16%

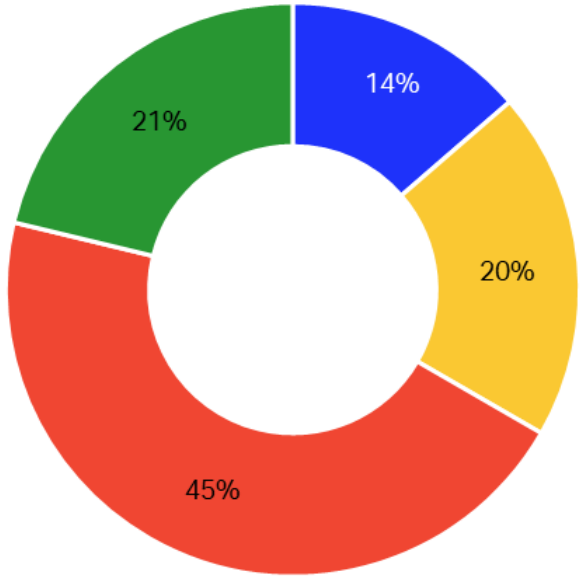
All Airline Safety Personnel responses indicated that their SOPs contain any formal callout to trigger a go-around in case of destabilization below the stabilization gate

Insight: Questions 21 & 24

- The 83 that could not confirm that Stable or Unstable calls are practice at the appropriate gate (Q21), 65% (54) of which have an SOP that contain callout to trigger a go-around in case of destabilization below the stabilization gate (Q24)
- 35% of those who could confirm that “Stable” or “Unstable” calls are practiced at the appropriate gate (Q21), their SOPs do not contain any formal callout to trigger a go-around in case of destabilization below the stabilization gate

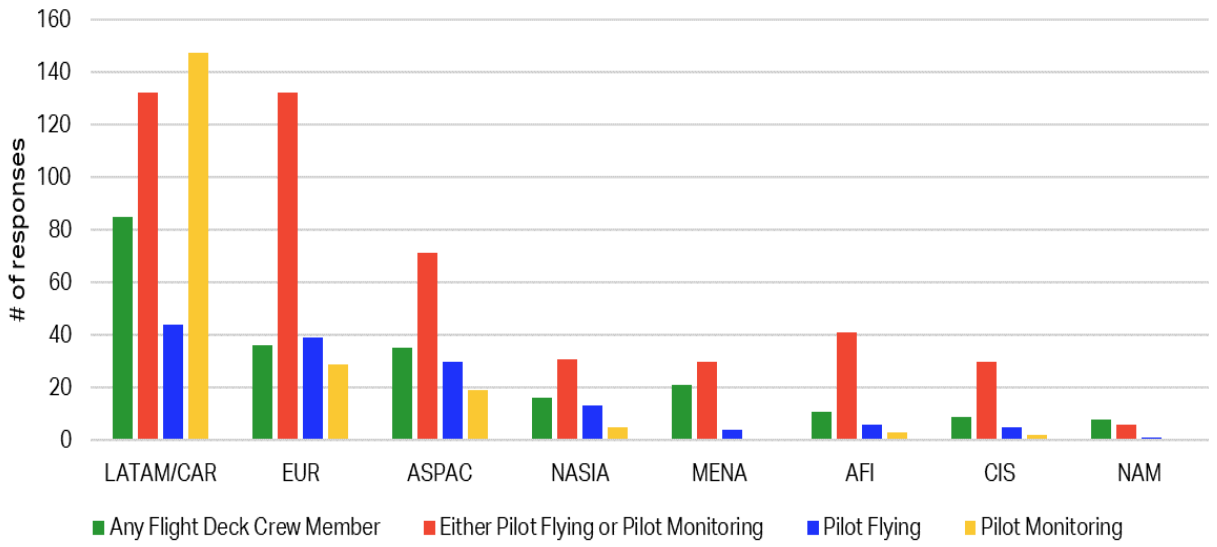
Question 25: In my organization, who usually makes a go-around callout when an approach is, or has become unstable, and that the response should be an immediate verbal response followed by a missed approach is.

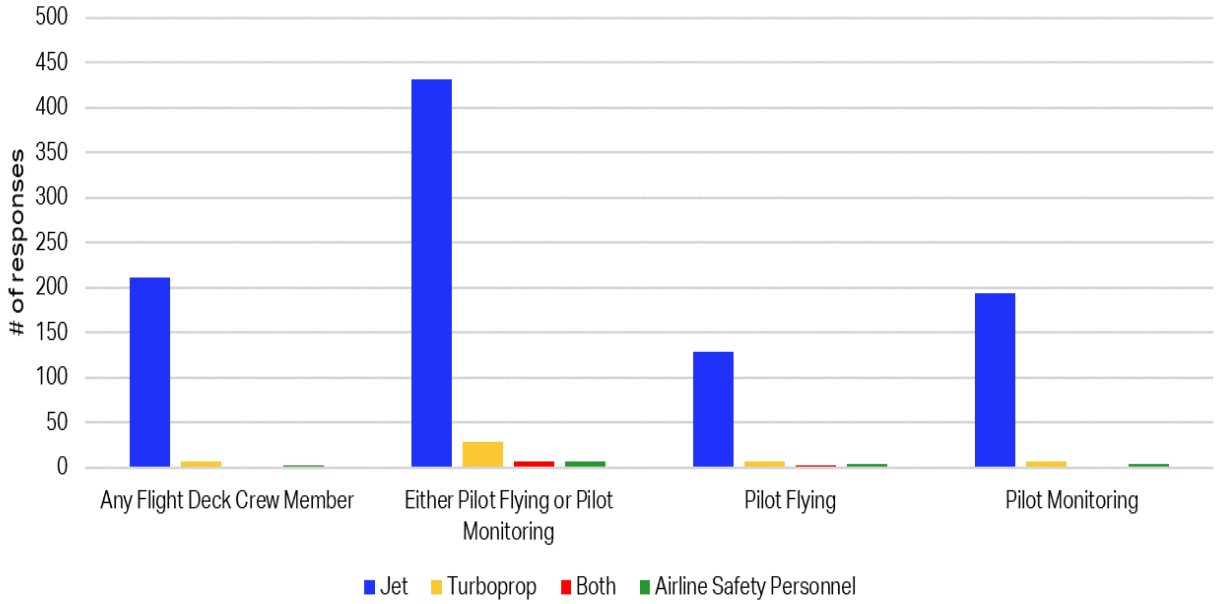
- Pilot Flying 142
- Pilot Monitoring 205
- Either Pilot Flying or Pilot Monitoring 473
- Any Flight Deck Crew Member 221



Of the 1041, 45% indicated that either Pilot Flying or Pilot Monitoring makes a go-around call when the approach has become unstable

Question 25: In my organization, who usually makes a go-around callout when an approach is, or has become unstable, and that the response should be an immediate verbal response followed by a missed approach is



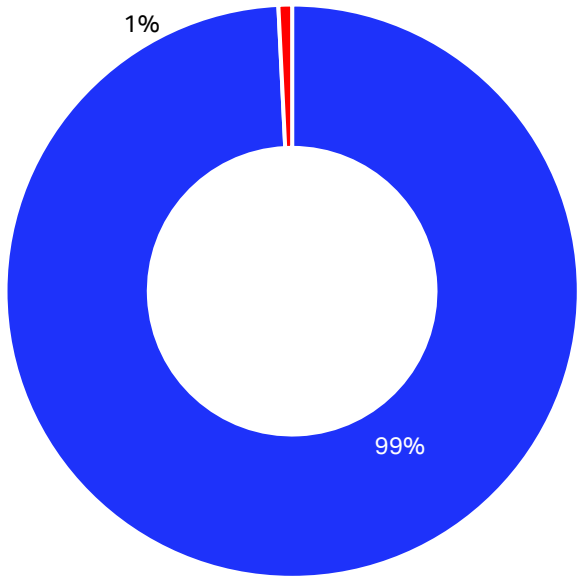


According to the survey responses, 36% of LATAM/CAR responses indicated that the Pilot Monitoring makes the call. NAM respondents indicated that any flight desk crew member makes the call. The rest of the regions, indicated that either pilot flying, or monitoring makes the call

58% of turboprop responses indicated that either pilot flying, or monitoring makes the call

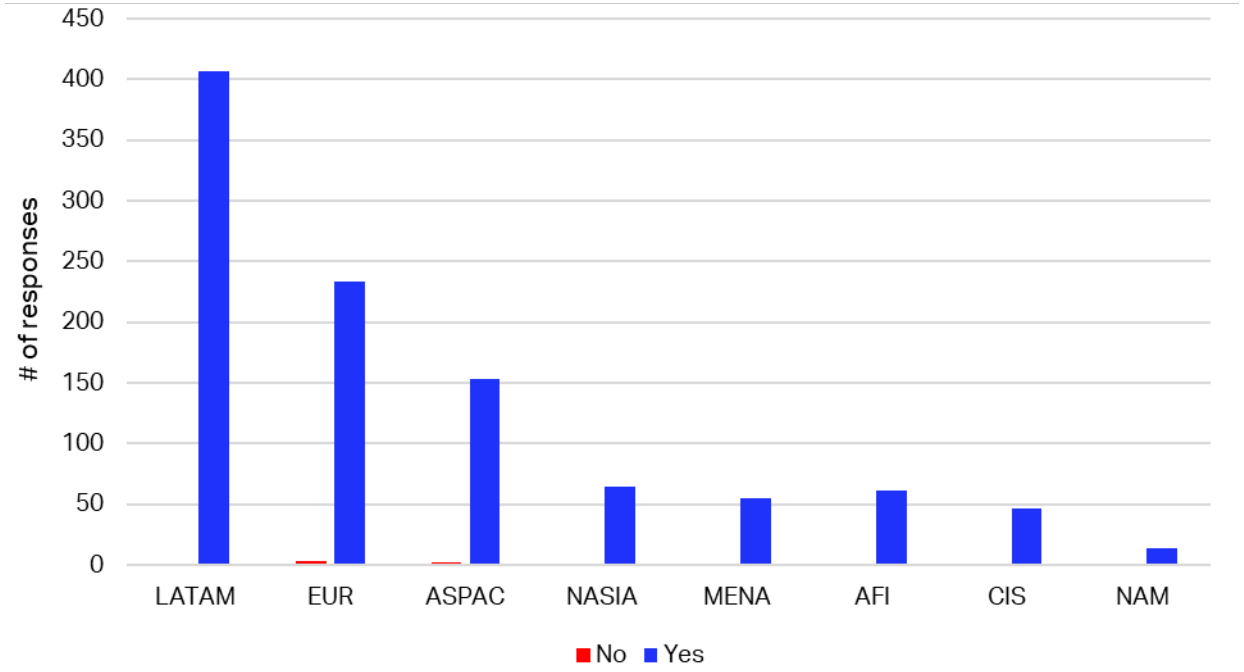
Question 26: If an approach is not stabilized in accordance with your company's criteria, does your SOP require that you execute a go-around

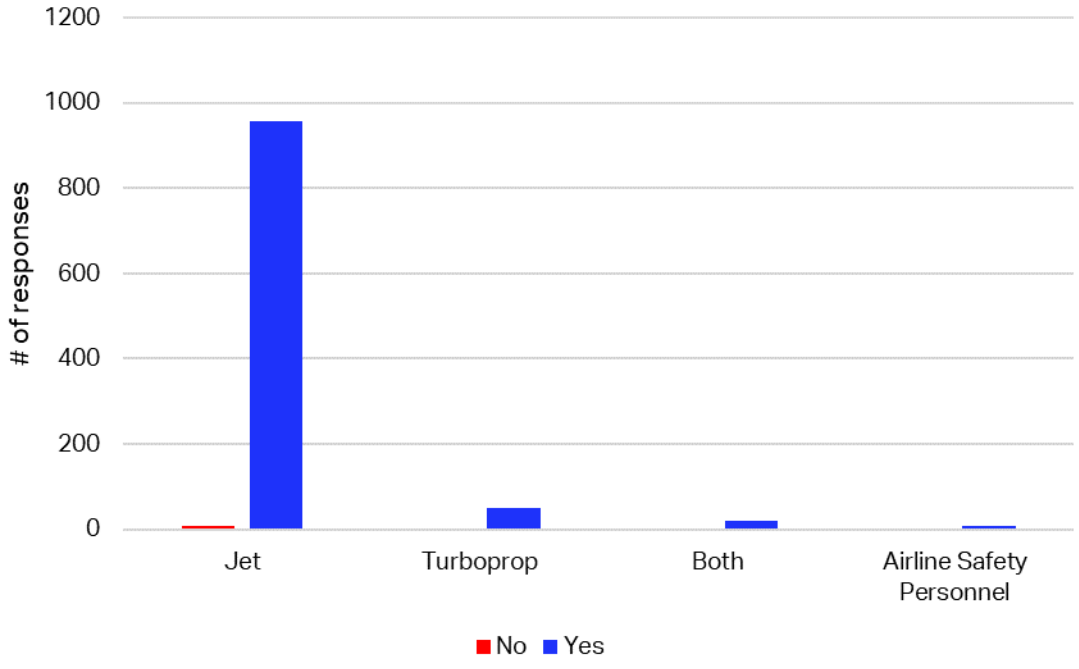
- Yes 1033
- No 8



99% confirmed that their SOPs require an execution of a go-around if an approach becomes unstable

Question 26: If an approach is not stabilized in accordance with your company's criteria, does your SOP require that you execute a go-around



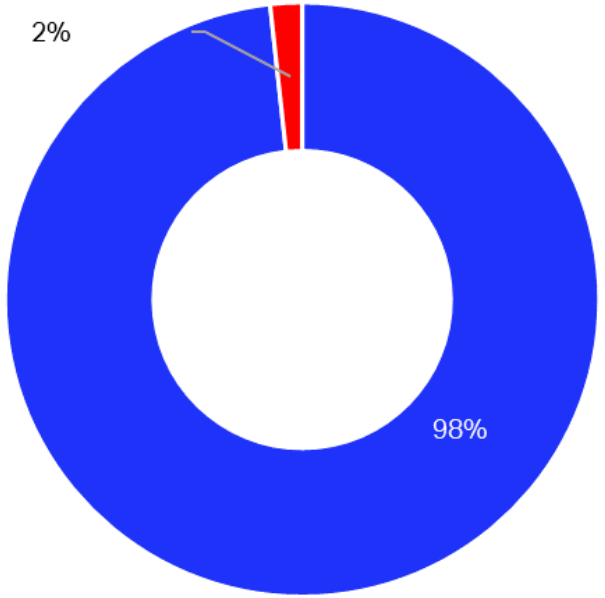


According to the survey responses, MENA, AFI and CIS have indicated that when the approach is not stabilized in accordance with the company's criteria, their SOPs require them to execute a go-around.

The 8 negative responses came from survey respondents who operate on jets

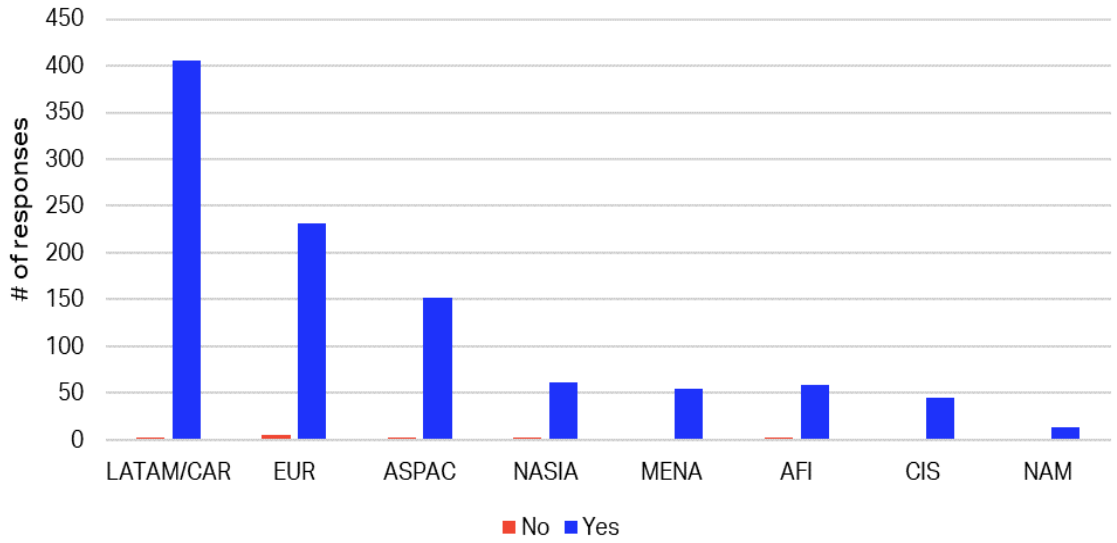
Question 27: In my organization, we have clear and concise SOPs that reflect the aircraft manufacturers' guidance and adopt the stable approach concept ….

- Yes 1023
- No 18

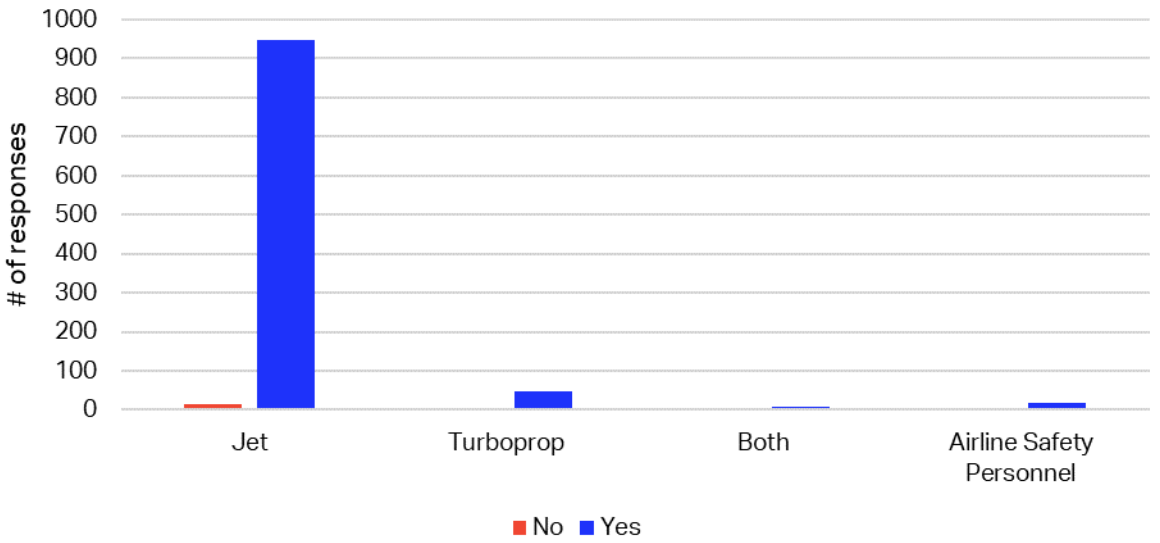


98% confirmed that they have clear and concise SOPs that reflect the aircraft manufacturers' guidance and adopt the stable approach concept, characterized by completion of briefings and checklists, maintaining a stable speed, descent rate, attitude, aircraft configuration, displacement relative to the approach path with power/thrust settings appropriate for the flight conditions until the commencement of the landing flare

Question 27: In my organization, we have clear and concise SOPs that reflect the aircraft manufacturers' guidance and adopt the stable approach concept ….



According to the survey responses, 28% from the negative responses are from European based survey respondents



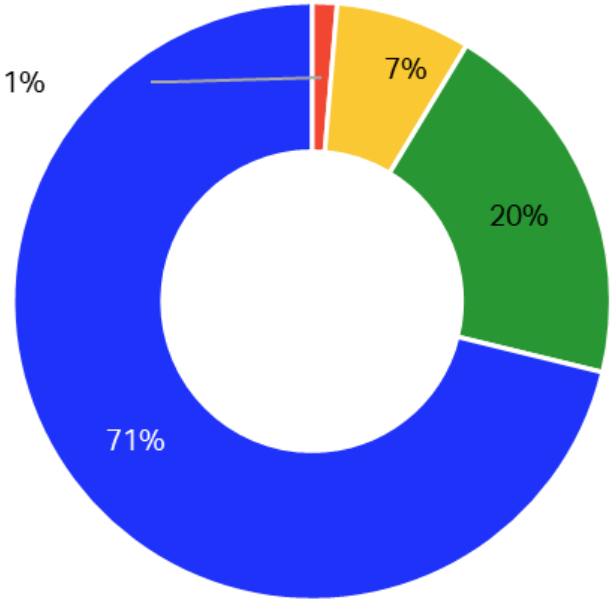
All 17 airline safety personnel confirmed that they have clear and concise SOPs that reflect the aircraft OEM's guidance

Insight: Questions 24, 26, 27

- 97% (100) of those whose SOPs do not contain any formal callout to trigger a go-around in case of destabilization below the stabilization gate (Q24), indicated however that their SOPs require execution of a go-around in case of the approach becomes unstable in accordance with their company's criteria (Q26)
- 99% who have clear and concise SOPs that reflect the aircraft manufacturers' guidance and adopt the stable approach concept, characterized by completion of briefings and checklists, maintaining a stable speed, descent rate, attitude, aircraft configuration, displacement relative to the approach path with power/thrust settings appropriate for the flight conditions until the commencement of the landing flare (Q27), their SOPs also require execution of a go around when the approach becomes unstable (Q26)

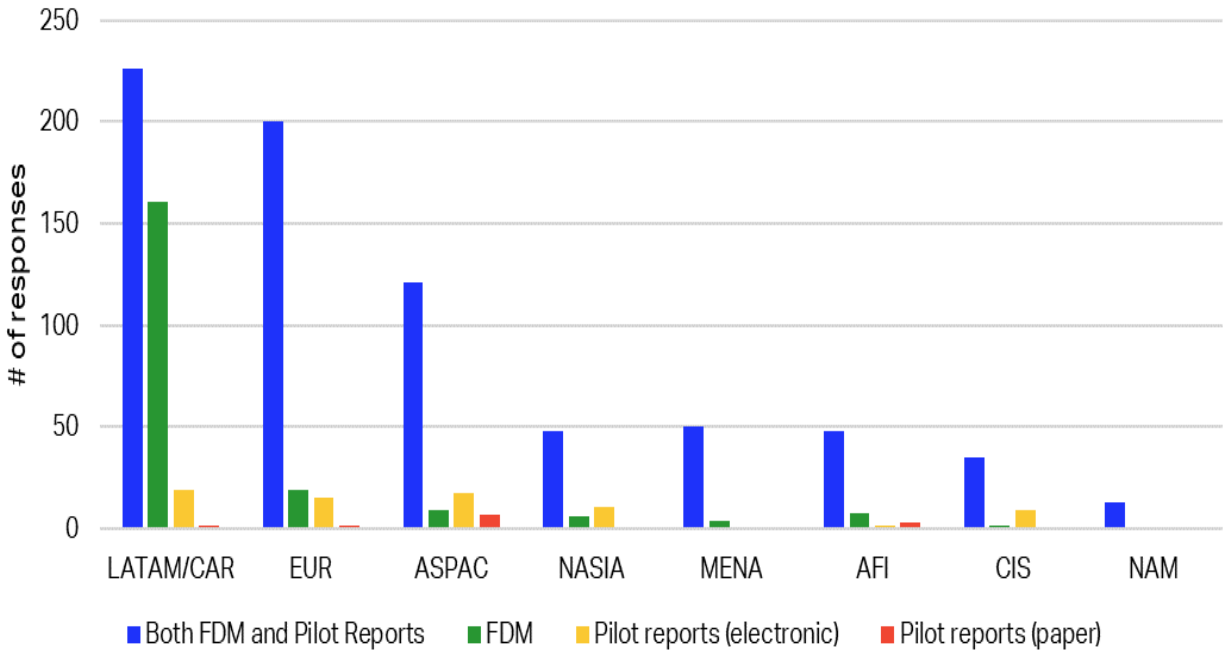
Question 28: How are unstable approach events captured in your airline?

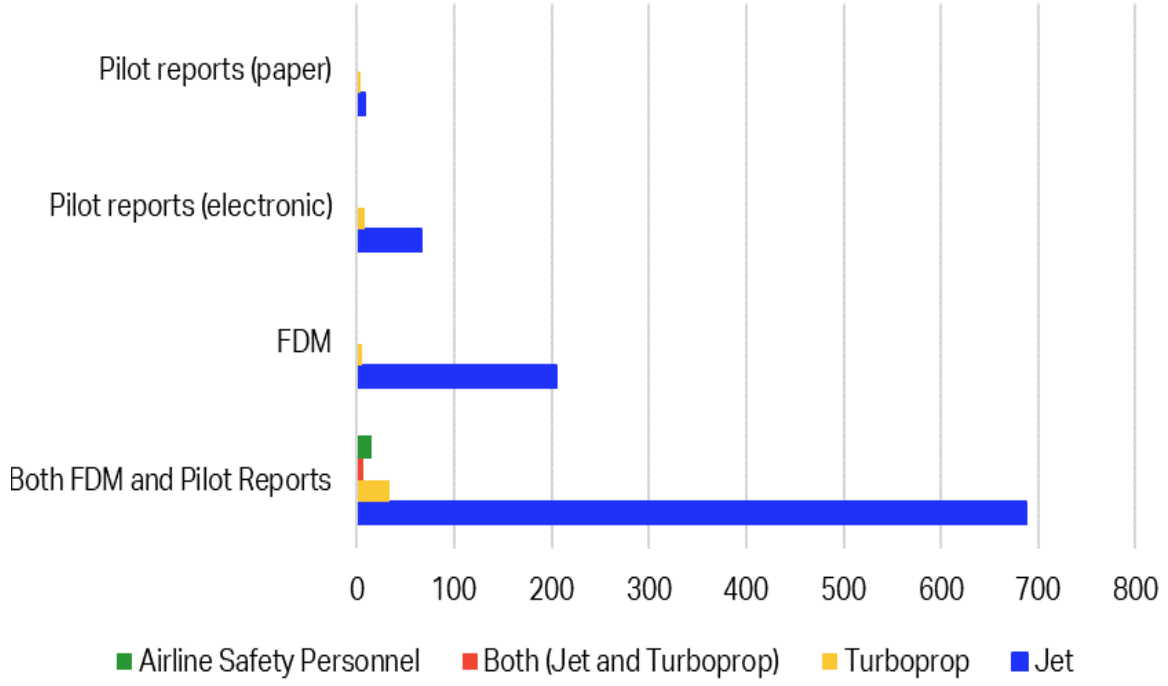
- Pilot reports (paper) 14
- Pilot reports (electronic) 76
- FDM 210
- Both FDM and Pilot Reports 741



71% indicated that unstable approach events are captured in their FDM program and by their Pilot Reports

Question 28: How are unstable approach events captured in your airline?



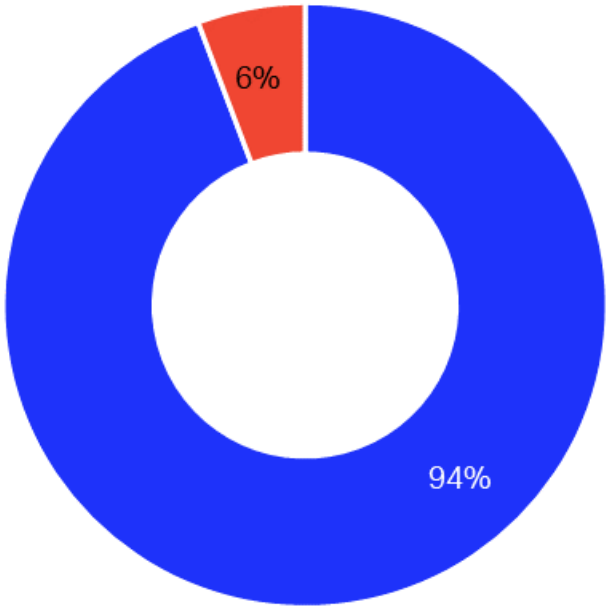


MENA, NASIA and NAM respondents have indicated that the unstable events are captured either in their FDM programs and by their pilot reports

All 17 airline safety personnel confirmed that they capture unstable approaches events in their FDM program and by Pilot reports

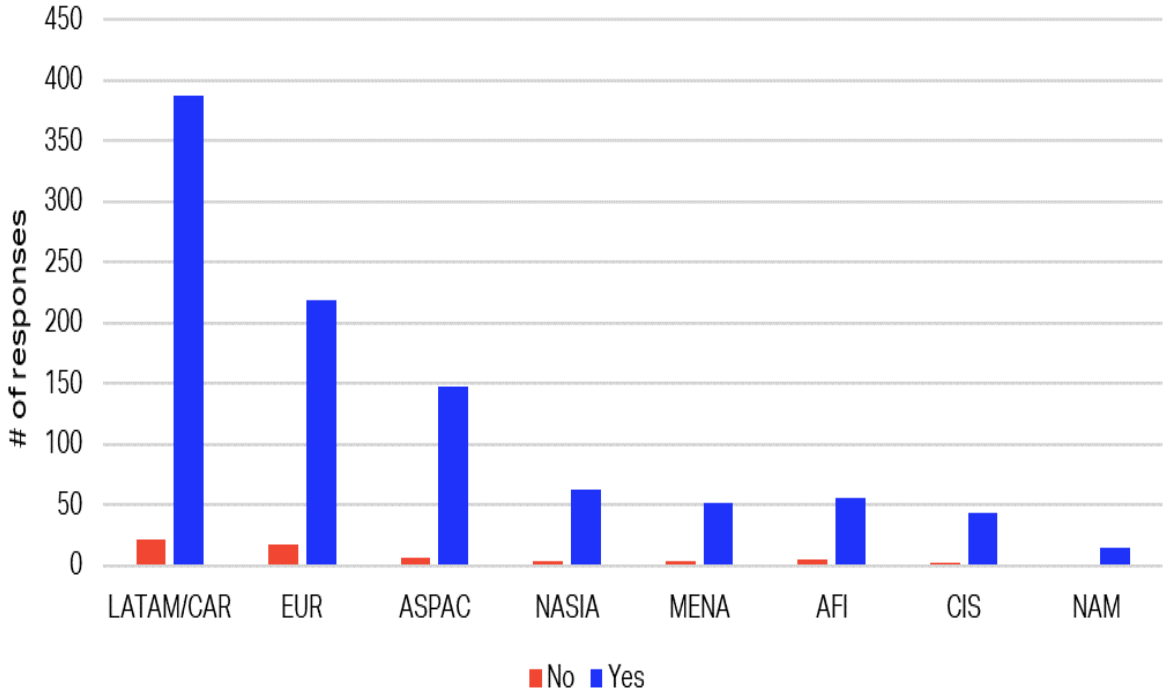
Question 29: In my organization, we use flight data monitoring to measure adherence to the SOPs

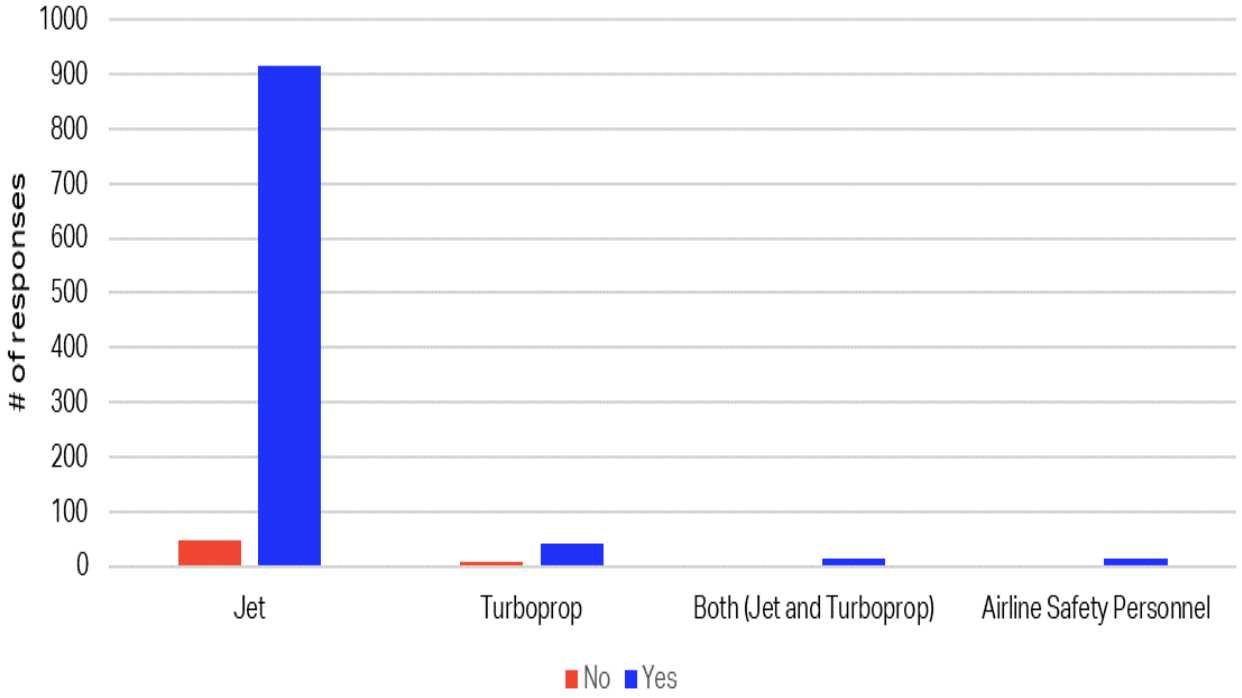
- Yes 981
- No 60



94% indicated that they use FDM to measure adherence to the SOPs

Question 29: In my organization, we use flight data monitoring to measure adherence to the SOPs

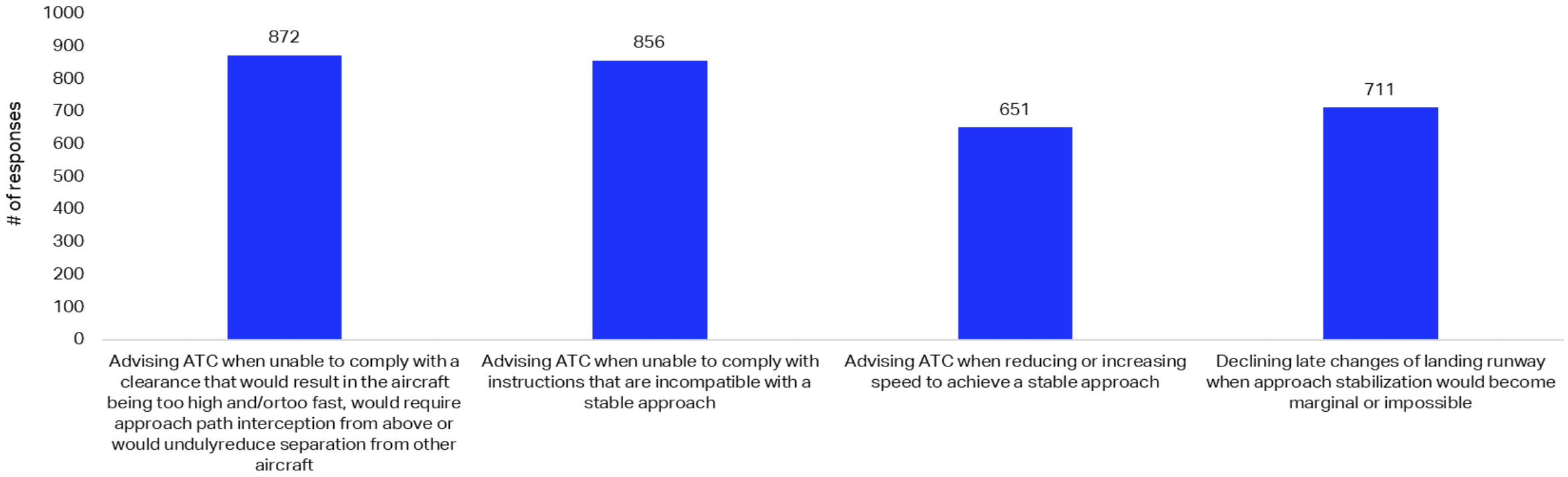




The majority of the respondents across all regions use of FDM data to measure compliance to SOPs

12% of the Airline Safety Personnel indicated that they do not use FDM data to measure adherence to SOPs

Question 30: As a pilot, do you contribute to stable approaches by

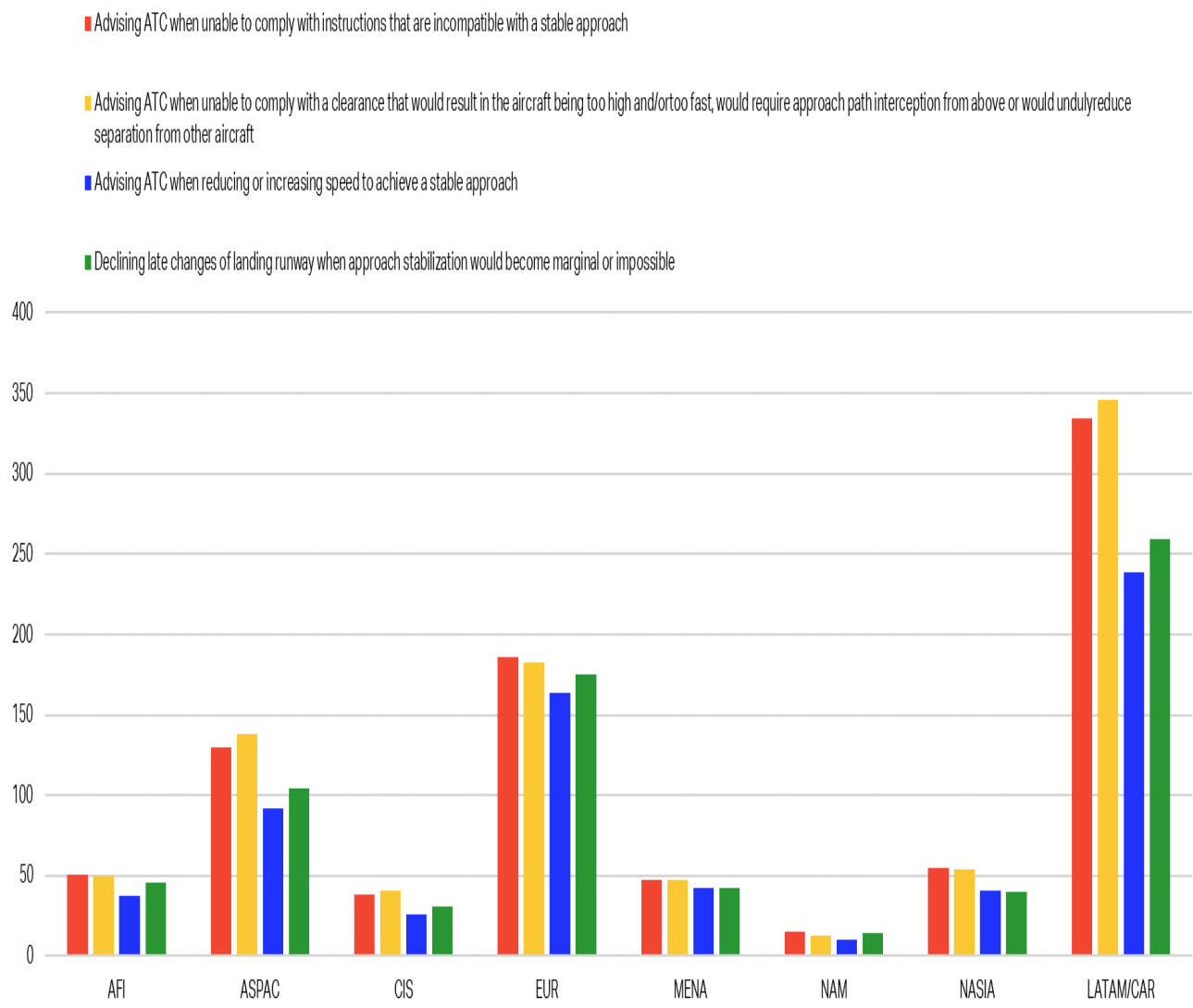


The results show that the respondents' selection that they contribute to stable approaches by advising ATC when unable to comply with a clearance that would result in the aircraft being too high and/or too fast, …. Is higher than the rest of the categories

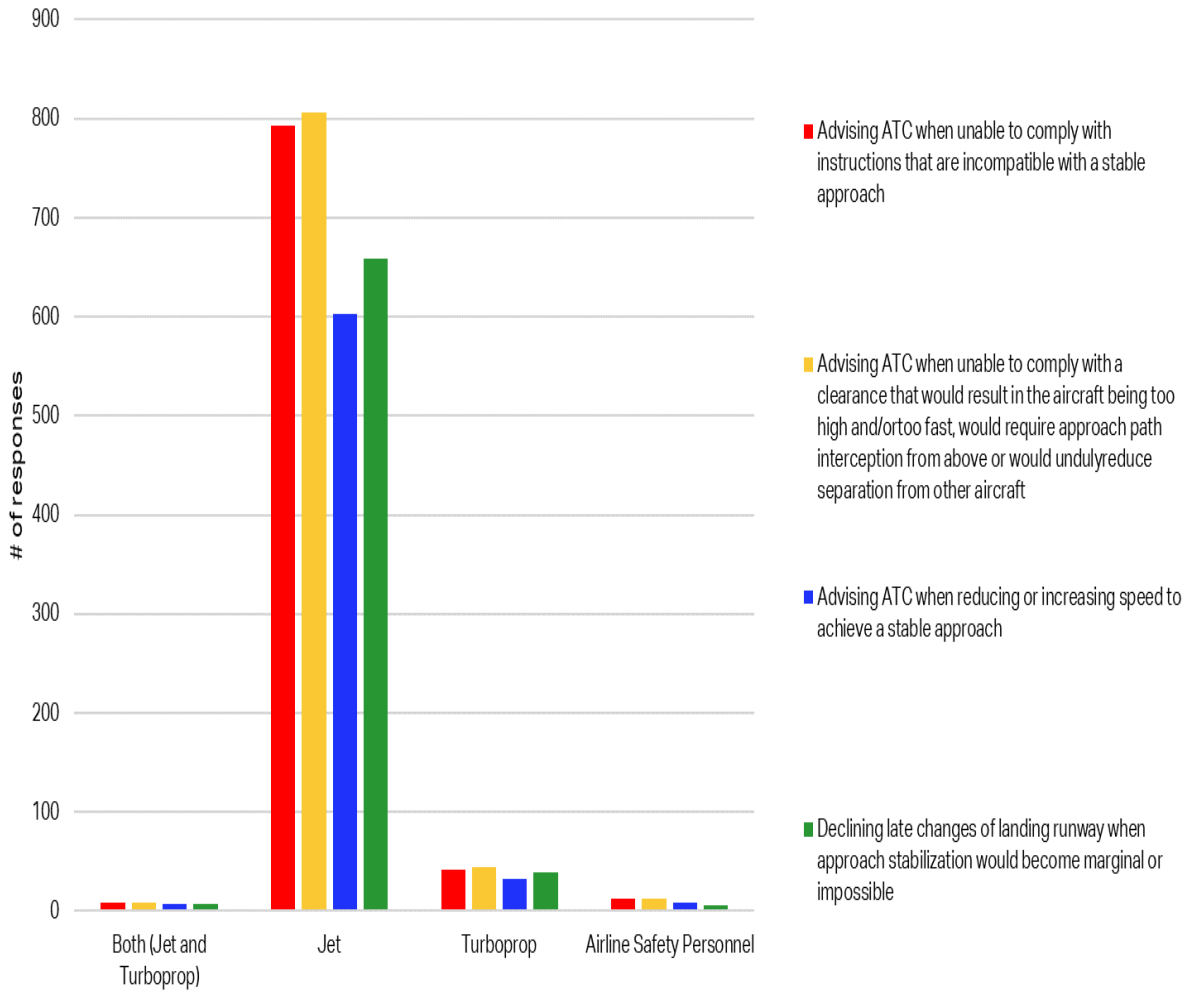
* This question allows all participants to check more than one answer and hence the numbers are higher than the number of survey respondents. Percentages are not calculated in this question because the same participant was able to select more than one answer.

Question 30: As a pilot, do you contribute to stable approaches by

All pilots across the regions contribute to all four categories. In LATAM/CAR and EUR, Pilots contribute to stable approaches by advising ATC when unable to comply with the clearance followed by advising ATC when unable to comply with instructions. Whereas, in EUR and NASIA, they contribute first by advising ATC when unable to comply with instructions and then when unable to comply with clearance

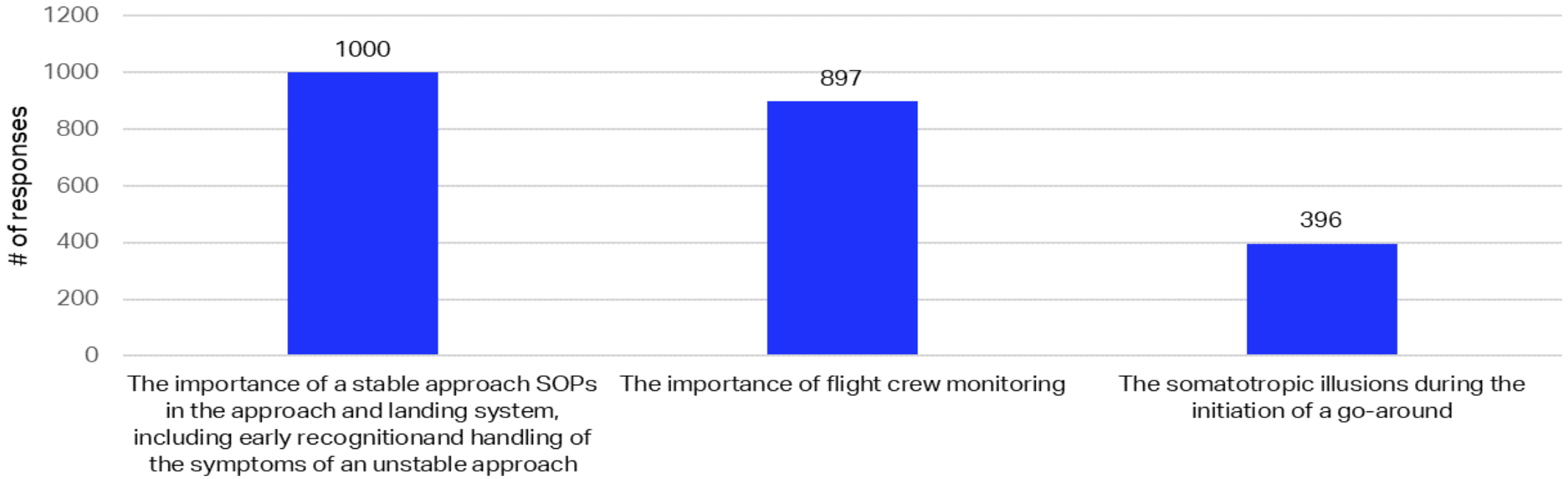


Question 30: As a pilot, do you contribute to stable approaches by



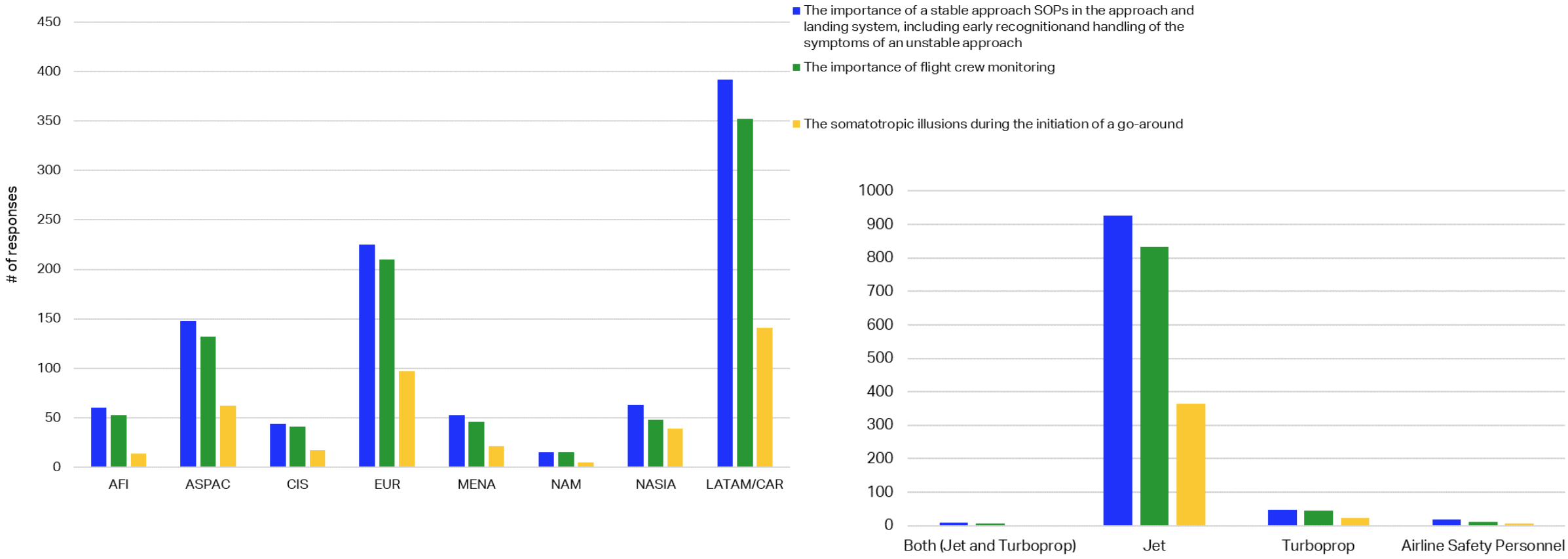
All pilots across the regions contribute to all four categories. Pilots who are operating on jet and turboprops as well as Airline Safety Personnel indicated that they are comfortable to advise ATC when unable to comply either with the clearance and instructions

Question 31: In my organization, training cover the following



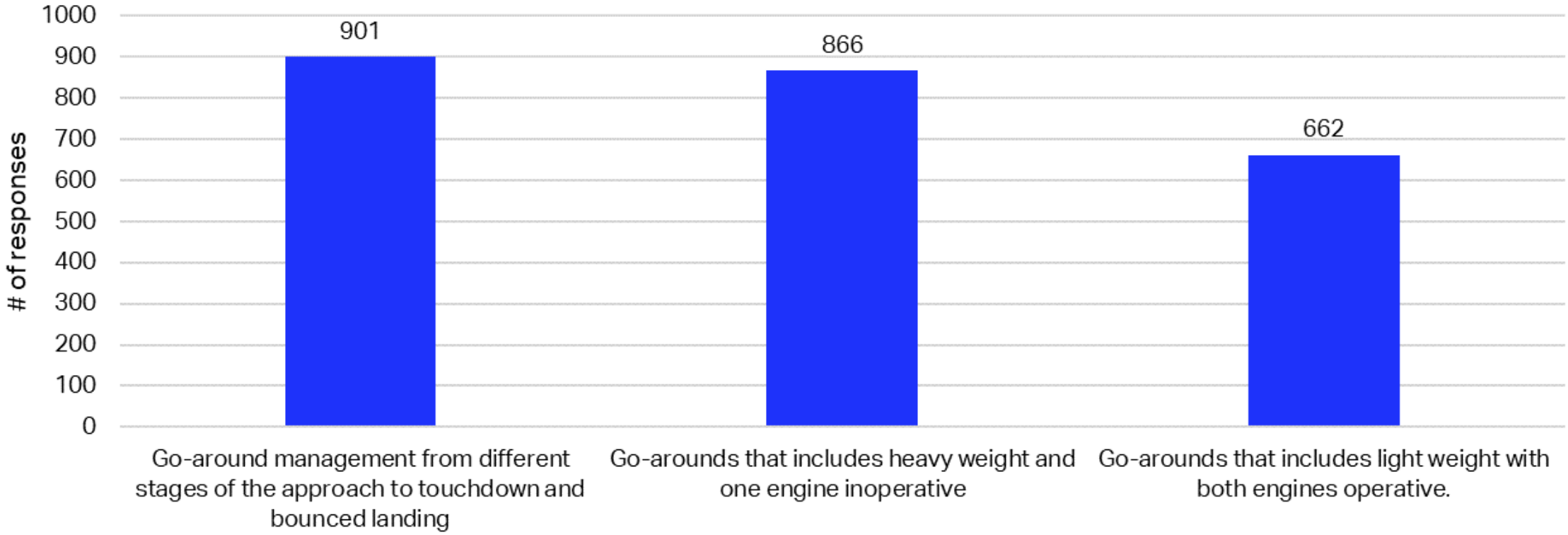
Questions 31 & 32 are related to training, but one is academic and the one is more on practice. Both questions allow all participants to check more than one answer and hence the numbers are higher than the number of survey respondents. Percentages are not calculated in these questions because the same participant was able to select more than one answer. The results show that the respondents' selection on the academic is more on the importance of stable approach SOPs in the approach and landing system.…. Is higher than the rest of the categories

Question 31: In my organization, training cover the following



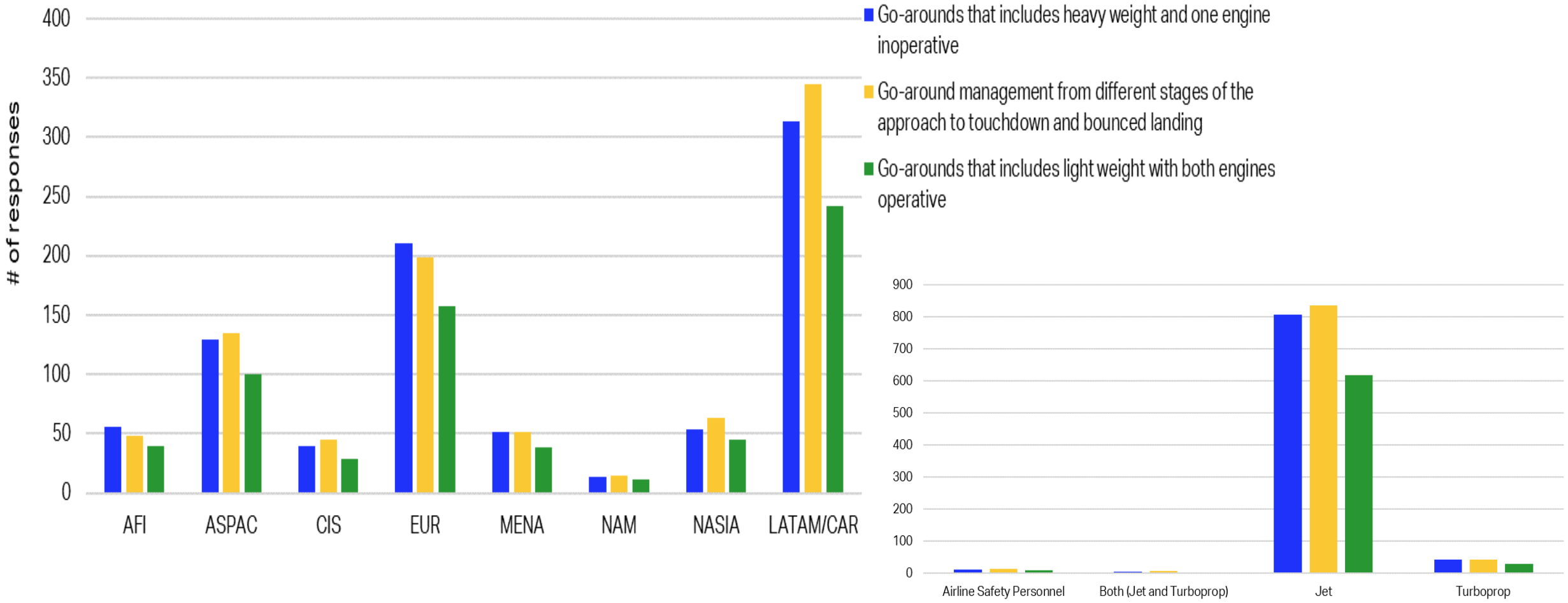
All of these elements are covered in their training programs. However, it was noted that the importance of stable approach SOPs in the approach and landing system has received the highest responses followed by the importance of flight crew monitoring and third the somatotropic during the initiation of go-around.

Question 32: In my organization, training covers the following



The results show that the respondents' selection on the practice part is more on the go-around management from different stages of the approach to touchdown and bounced landing is higher than the rest of the categories

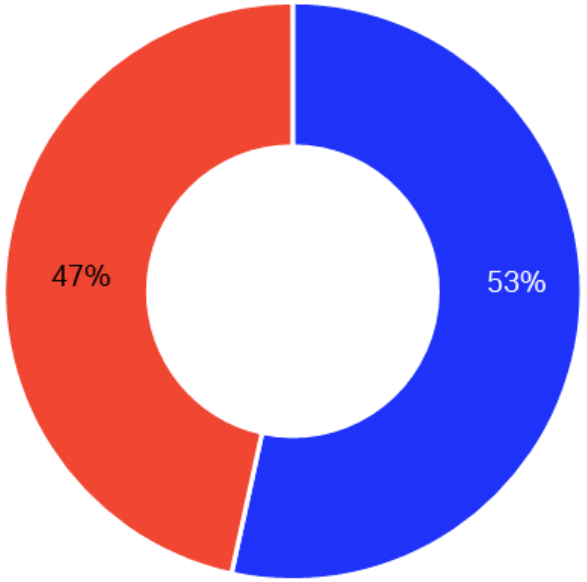
Question 32: In my organization, training covers the following



The go-around management element is more practiced in LATAM/CAR, ASPAC, and NASIA as well as the respondents who operate on turboprop fleet

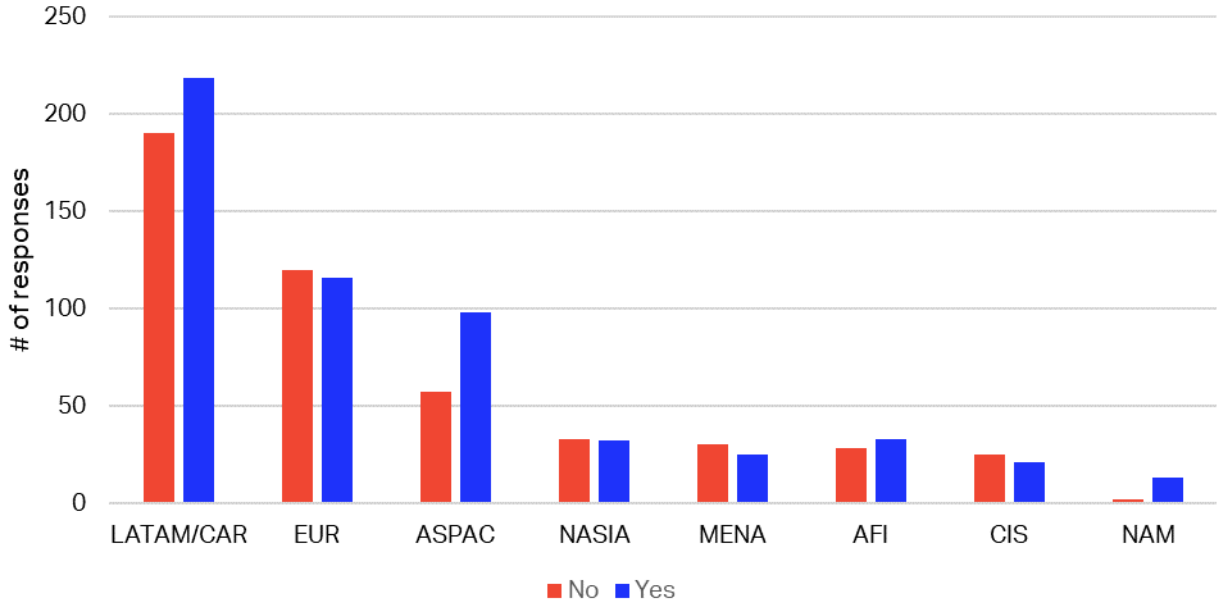
Question 33: In my organization, we work with ANSP/ATSU to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

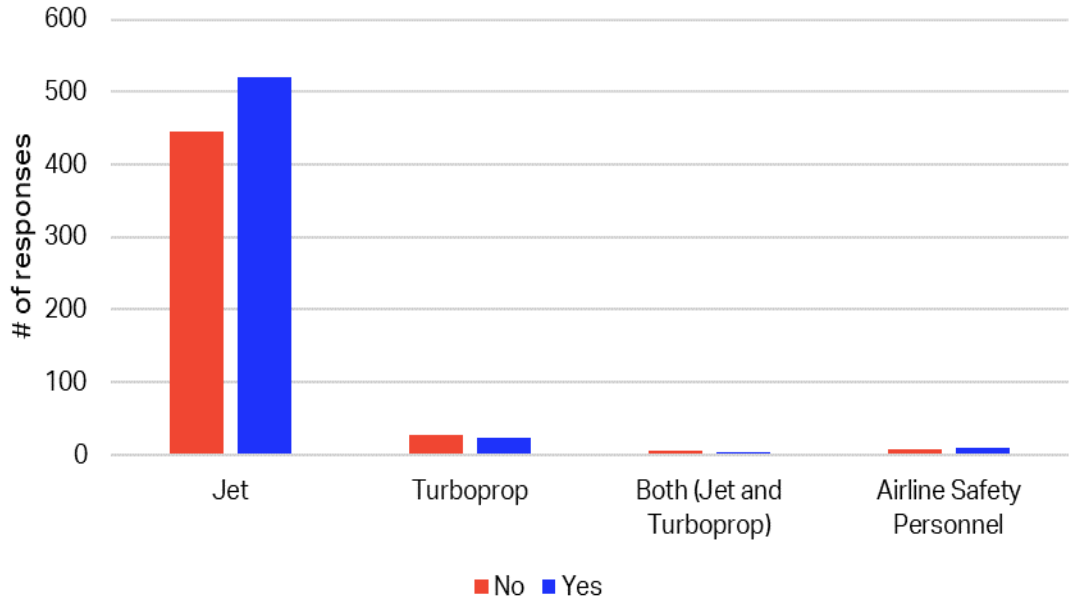
- Yes 901
- No 866



53% indicated that they work with ANSP/ATSU to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

Question 33: In my organization, we work with ANSP/ATSU to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

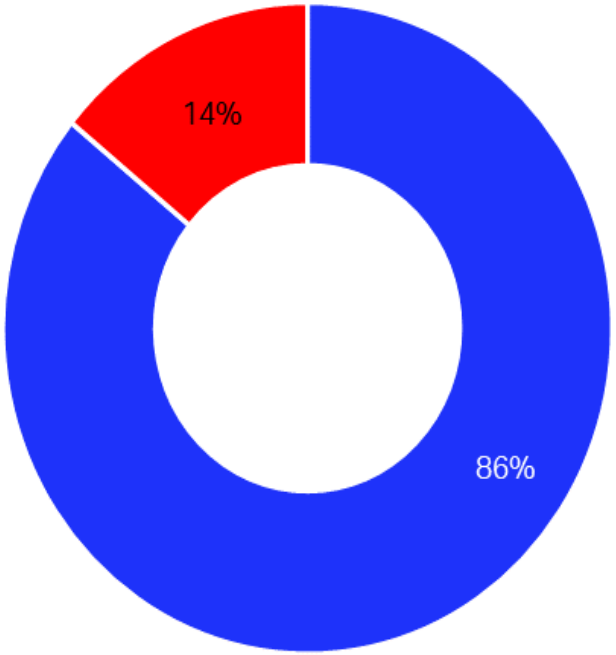




It is apparent that the respondents in LATAM/CAR, ASPAC and NAM as well as the respondents who are operating on jet fleet have higher response rate when it comes to working with ANSP/ATSU to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

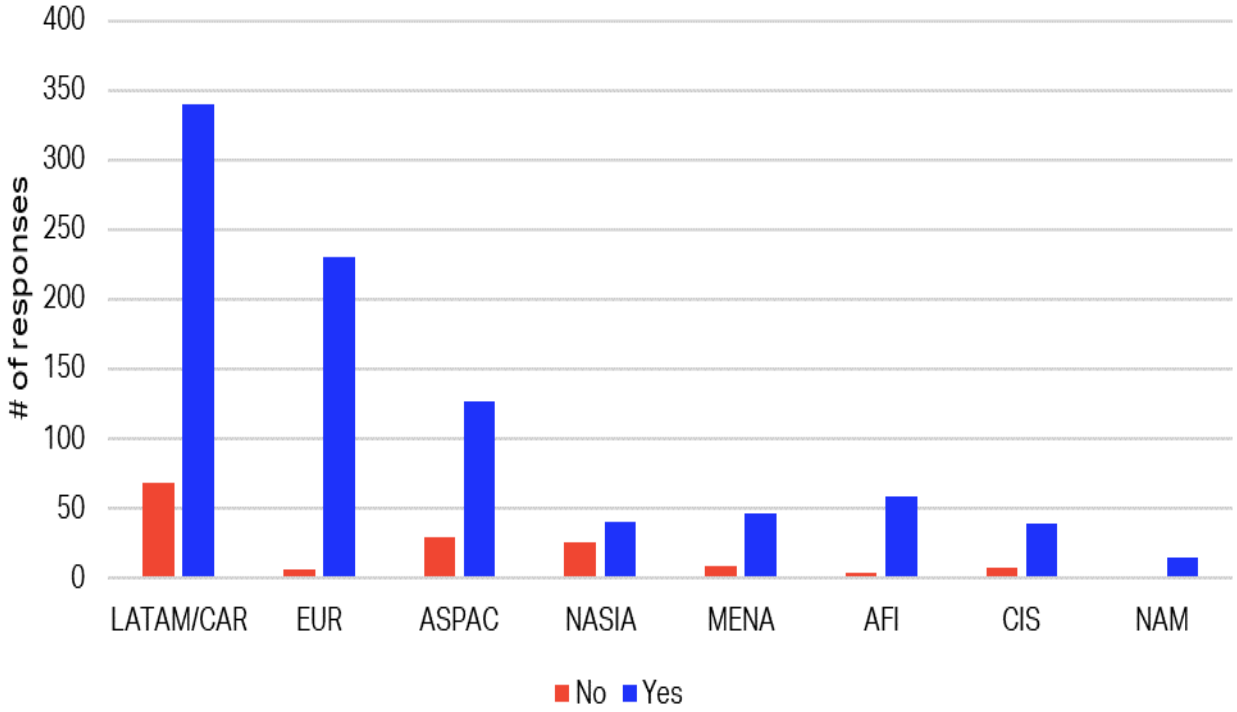
Question 34: In my organization, we have a non-punitive safety policy

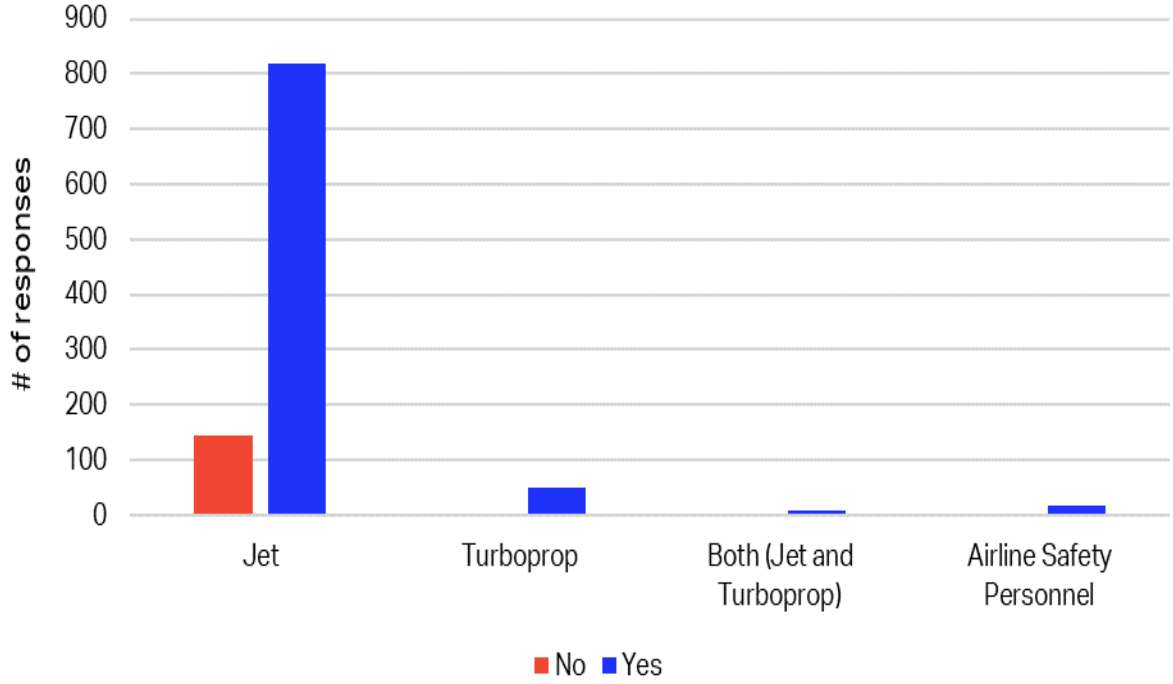
- Yes 894
- No 147



86% indicated that their organizations have a non-punitive safety policy

Question 34: In my organization, we have a non-punitive safety policy

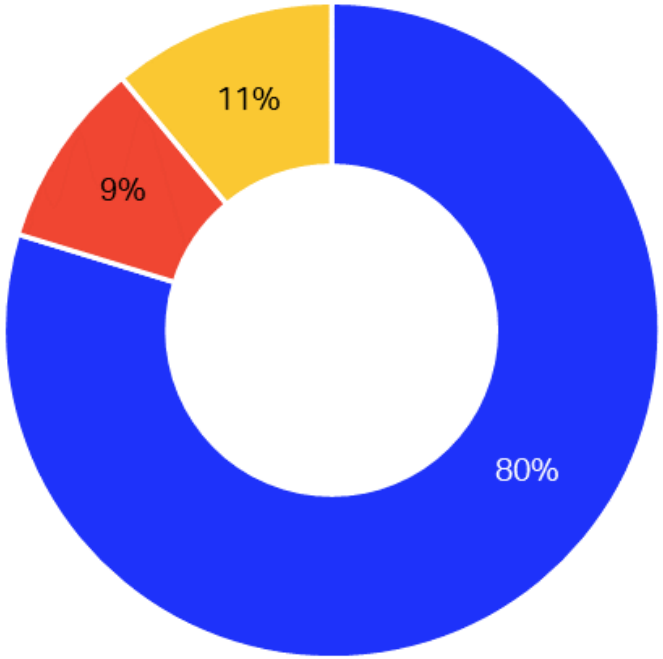




All NAM respondents and respondents who operate on turboprop indicated that they have a non-punitive safety reporting system in all areas where operations are conducted

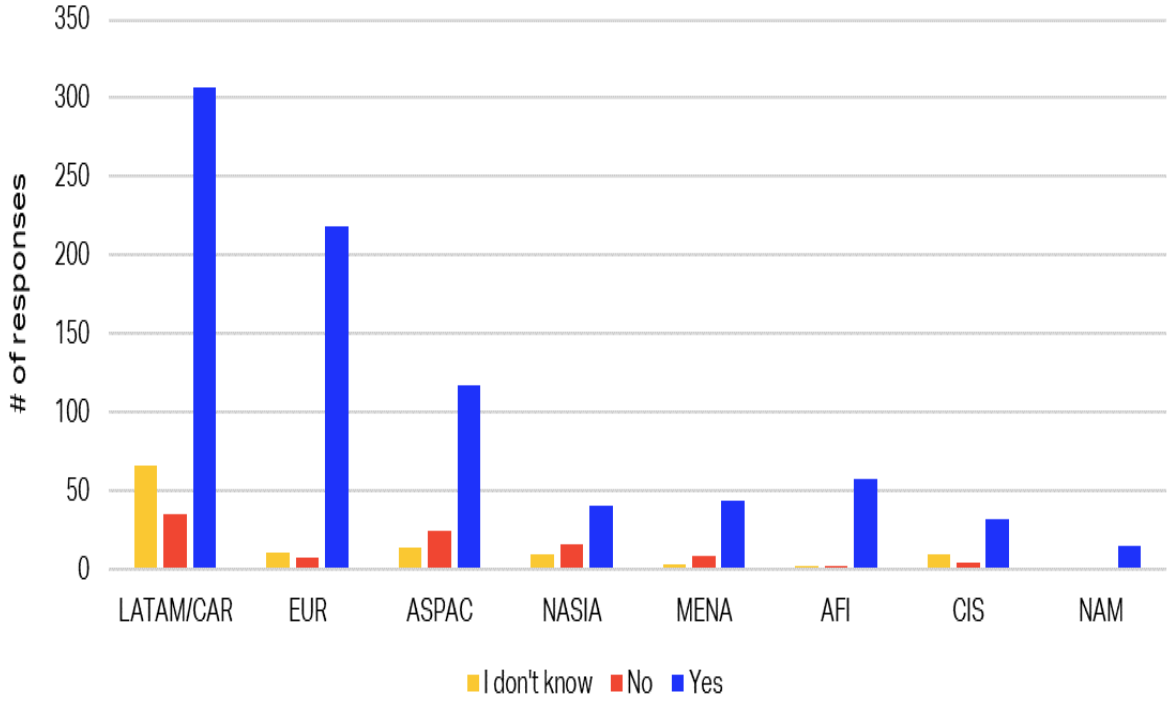
Question 35: In my organization, we have a non-punitive safety reporting system in all areas where operations are conducted

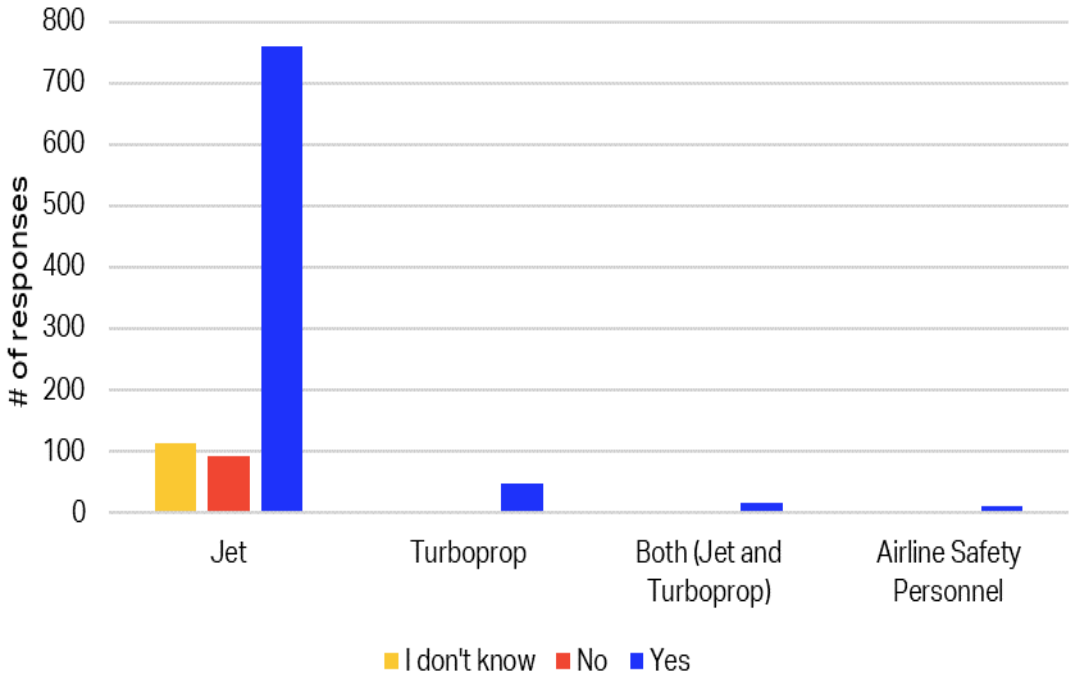
- Yes 830
- No 96
- I don't know 115



80% indicated that their organizations have a non-punitive safety reporting system in all areas where operations are conducted

Question 35: In my organization, we have a non-punitive safety reporting system in all areas where operations are conducted

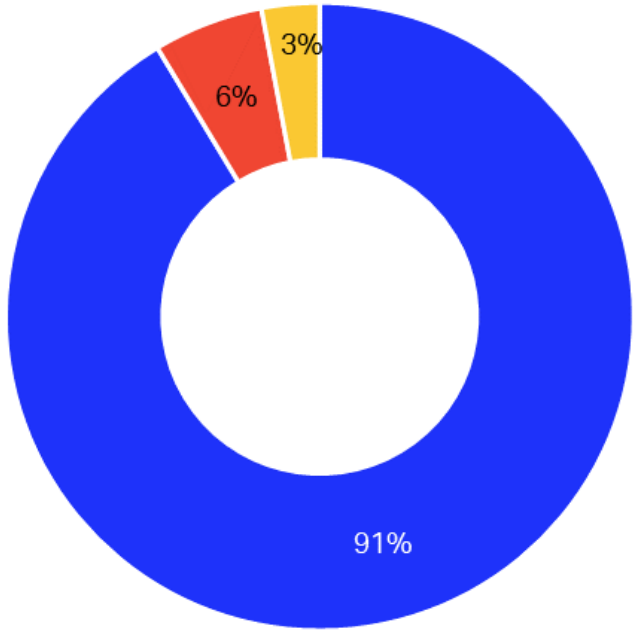




All NAM respondents and respondents who operate on turboprop indicated that they have a non-punitive safety reporting system in all areas where operations are conducted

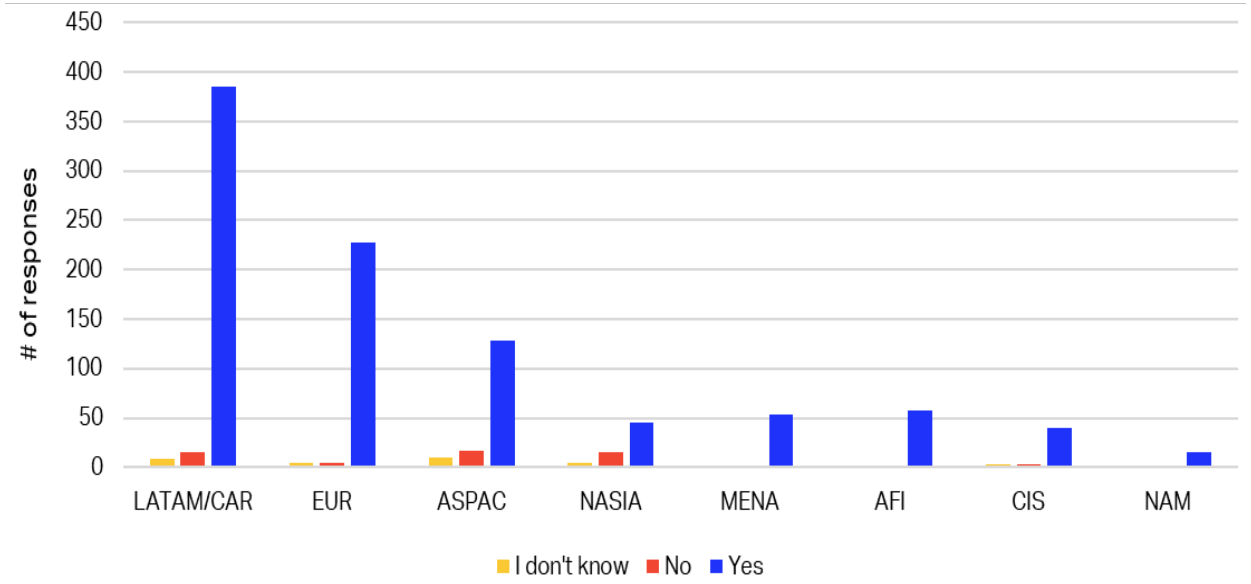
Question 36: In my organization, we have a non-punitive go-around policy

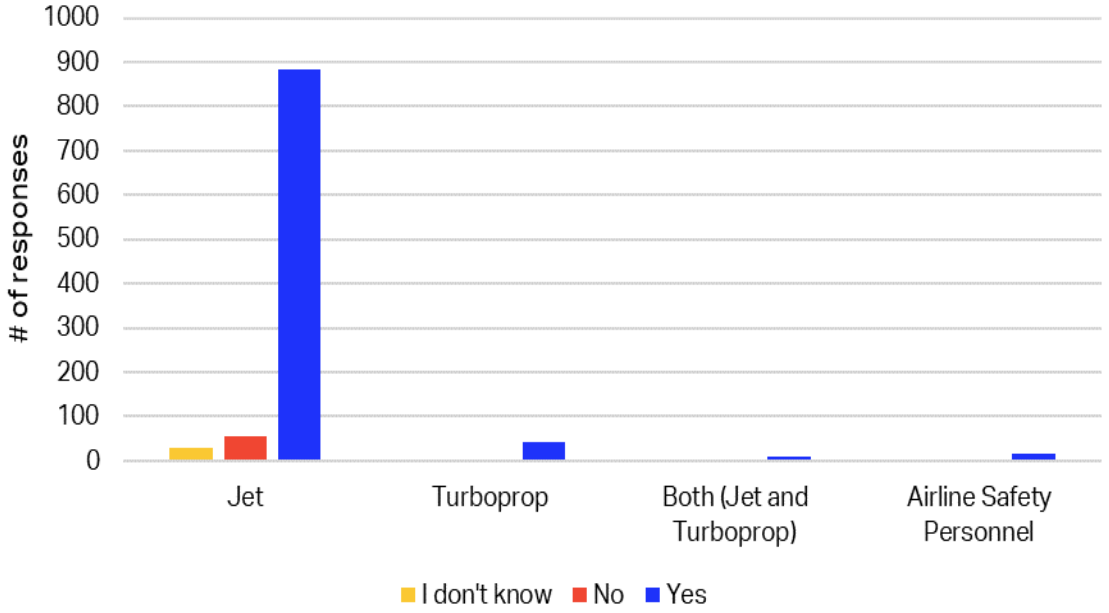
- Yes 951
- No 59
- I don’t know 31



91% indicated that their organizations have a non-punitive go-around policy

Question 36: In my organization, we have a non-punitive go-around policy





The majority of the respondents have a non-punitive go-around policy

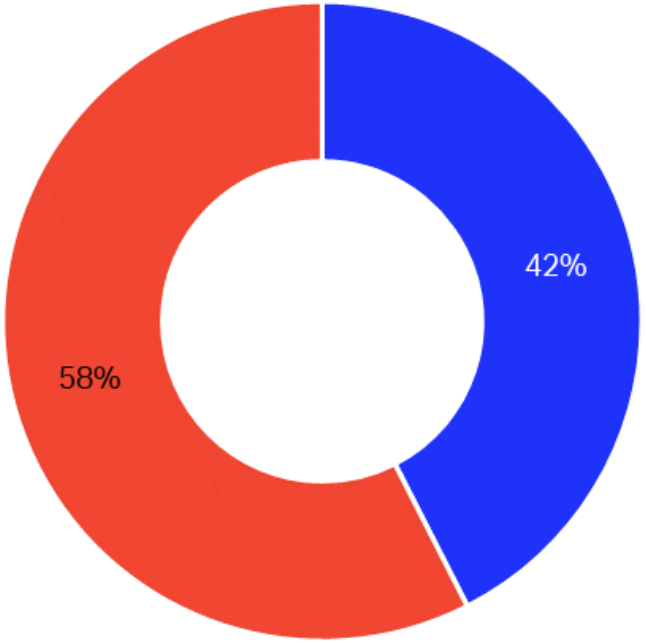
Insight: Questions 34, 35, 36

- 52% of those who do not have a non-punitive safety policy (Q34) do have a non-punitive safety reporting system in all areas where operations are conducted (Q35)
- 26% of those who do not have a non-punitive safety policy (Q34) are not sure if they have a non-punitive safety reporting system in all areas where operations are conducted (Q35)
- 9% of those who have a non-punitive safety policy (Q34) are not sure if they have a non-punitive safety reporting system in all areas where operations are conducted (Q35)
- 89% of those who have a non-punitive safety policy (Q34) have a non-punitive safety reporting system in all areas where operations are conducted (Q35)
- 96% of those who have a non-punitive safety policy (Q34) have a non-punitive go-around policy (Q36)
- 63% of those who do not have a non-punitive safety policy (Q34) do have a non-punitive go-around policy (Q36)
- 6% of those who do not have a non-punitive safety policy (Q34) are not sure if they have a non-punitive go-around policy (Q36)

Survey Questions Addressing Air Traffic Control Officers and Air Navigation Service Providers Safety Personnel

Question 37: Are you familiar with the 3rd edition of the Guidance Material

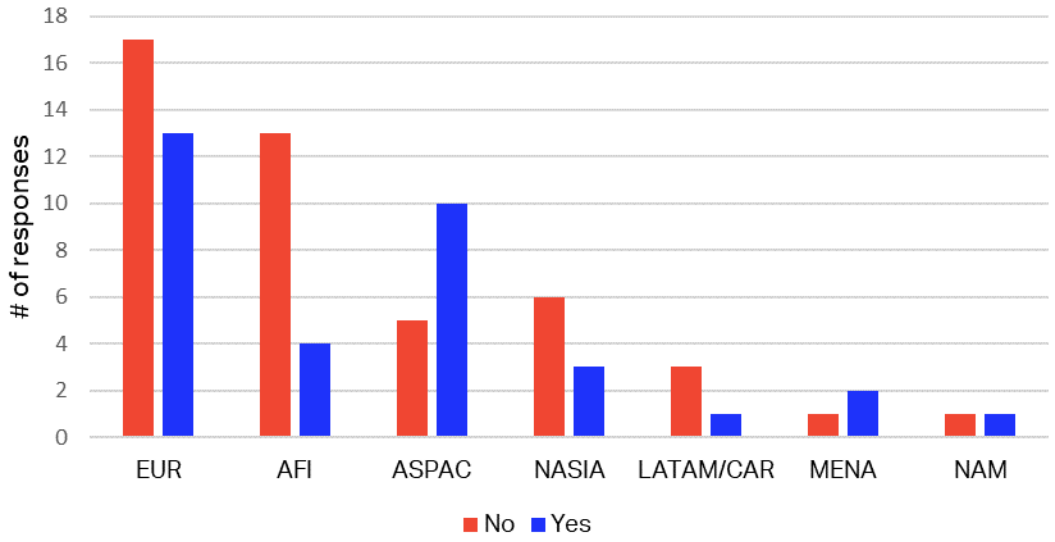
- Yes 34
- No 46



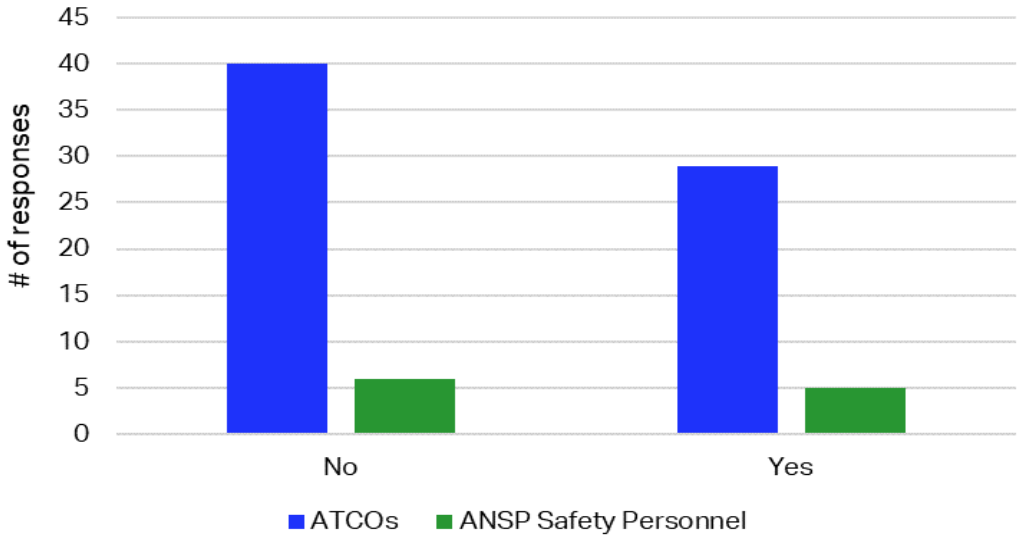
Of the 80 ATCOs and ANSPs responses, 42% are familiar with the guidance material

Comparison: 52% of pilots and airline safety personnel versus 42% of ATCOs and ANSP safety personnel are familiar with the GM

Question 37: Are you familiar with the 3rd edition of the Guidance Material



ATCOs and ANSP Safety Personnel respondents who are based in ASPAC and MENA are more familiar with the GM than the rest of the regions



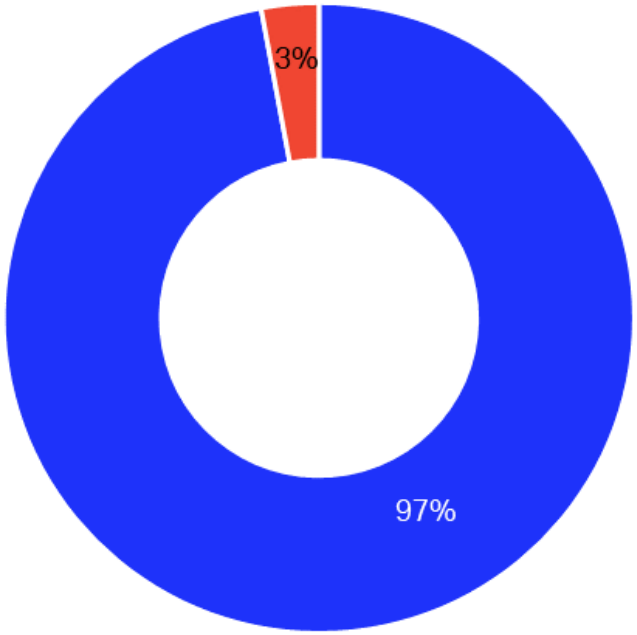
55% of the ANSP Safety Personnel and 58% of the ATC personnel are familiar with the GM

Comparison Airline safety personnel and Pilots respondents who are based in EUR, ASPAC, NASIA, MENA and NAM are more familiar with the GM than the rest of the regions

The respondents who are not familiar with the IATA/IFALPA/IFATCA and CANSO Guidance Material (GM) on "Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices will not be able to answer questions 39 to 43, thus the survey was arranged for those respondents to skip these questions and resume by answering question 44. So, the percentages for these questions are based on the 34 responses (who are familiar with the GM).

Question 39: The GM helped me to better understand the importance of stable approach criteria as critical elements of flight safety

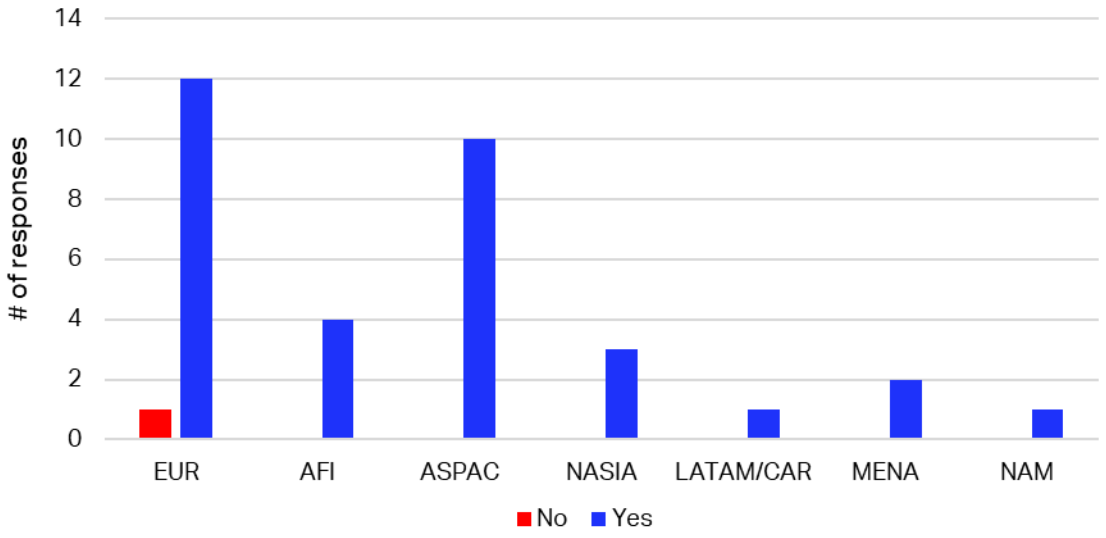
- Yes 33
- No 1

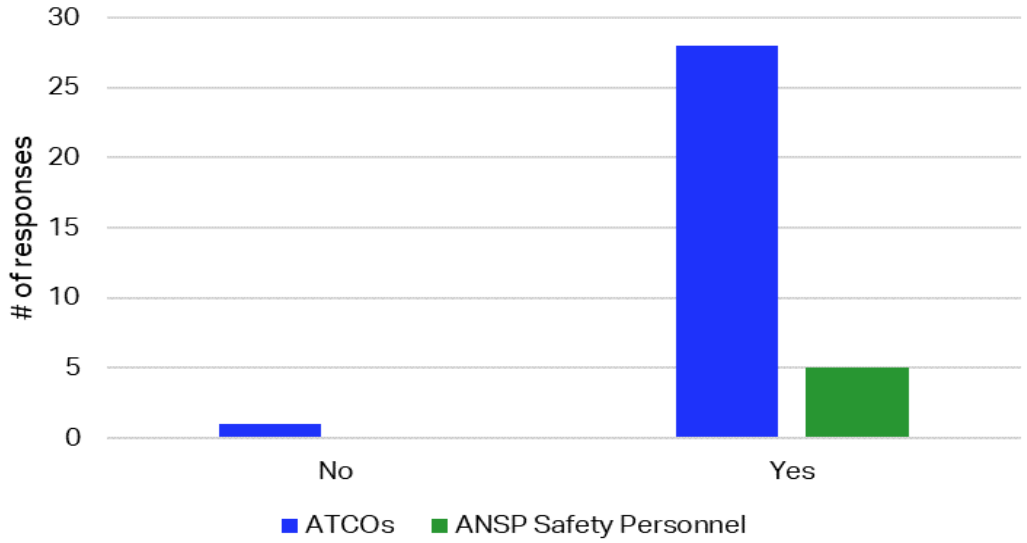


97% of the ATCOs and ANSP Safety Personnel respondents who are familiar with the GM (34) agree that the GM helped them to better understand the importance of stable approach criteria as critical elements of flight safety

Comparison: 96% of the pilot and airline safety personnel who are familiar with the GM (537) agree that the GM helped them to better understand the importance of stable approach criteria as critical elements of flight safety

Question 39: The GM helped me to better understand the importance of stable approach criteria as critical elements of flight safety



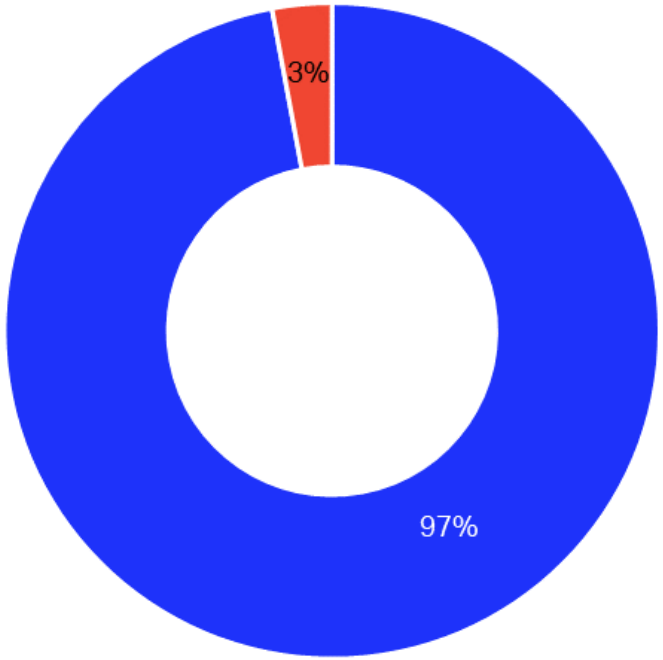


The GM helped the respondents based in all regions to better understand the importance of stable approach critical as critical elements. 92% of the European respondents confirmed that this GM helped them

The GM helped most of the respondents who indicated that they are familiar with the GM, to better understand the importance of stable approach criteria as critical elements. Of the 29 ATC respondents, 97% confirmed that this GM helped them

Question 40: The GM helped me to increase my awareness on the risks of UA

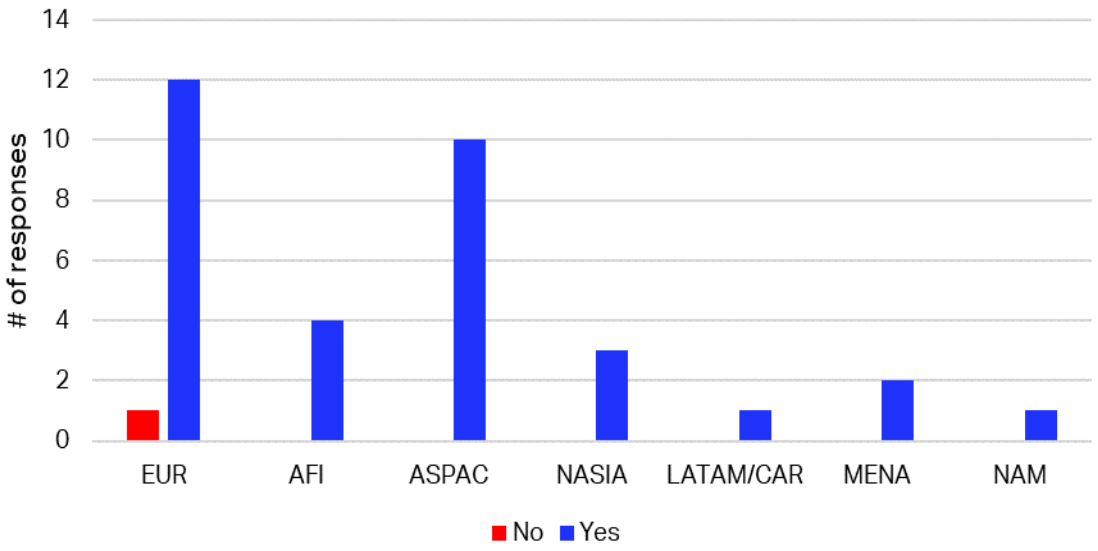
- Yes 33
- No 1



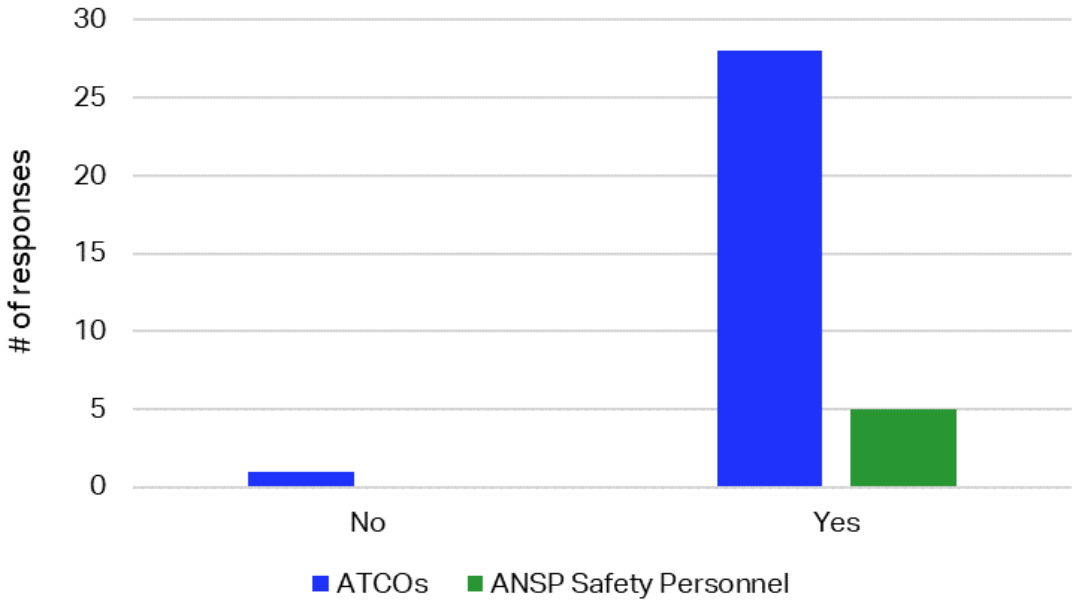
97% of the ATCOs and ANSP Safety Personnel who are familiar with the GM (34) agree that the GM helped them to increase my awareness on the risks of unstable approaches

Comparison: 96% of the pilots and airline safety personnel who are familiar with the GM (537) agree that the GM helped them to increase my awareness on the risks of unstable approaches

Question 40: The GM helped me to increase my awareness on the risks of UA



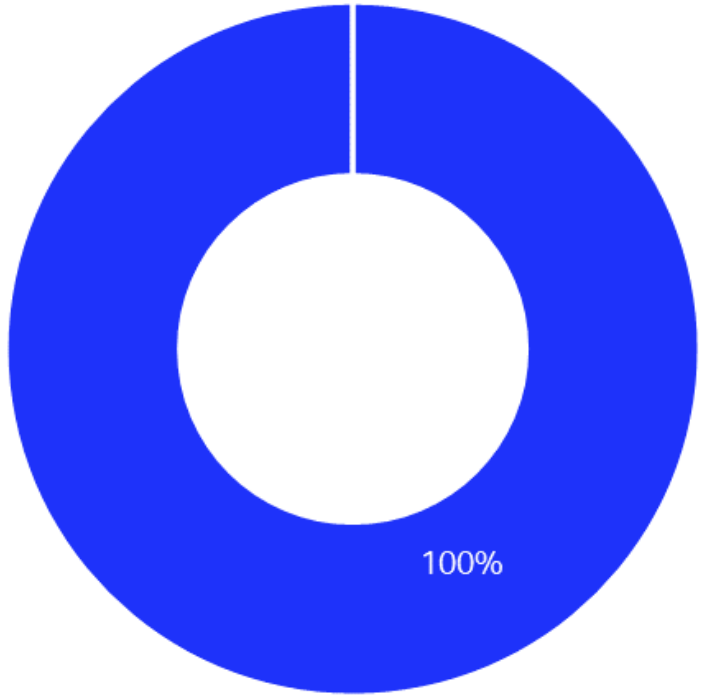
The GM helped the respondents based in all regions to increase their awareness on the risks of UA. 97% of the respondents confirmed that this GM helped them



The GM helped most of the respondents who indicated that they are familiar with the GM, to increase their awareness on the risks of UA. Of the 29 ATCOs, 97% confirmed that this GM helped them

Question 41: The GM helped me to better understand the factors that lead to UA

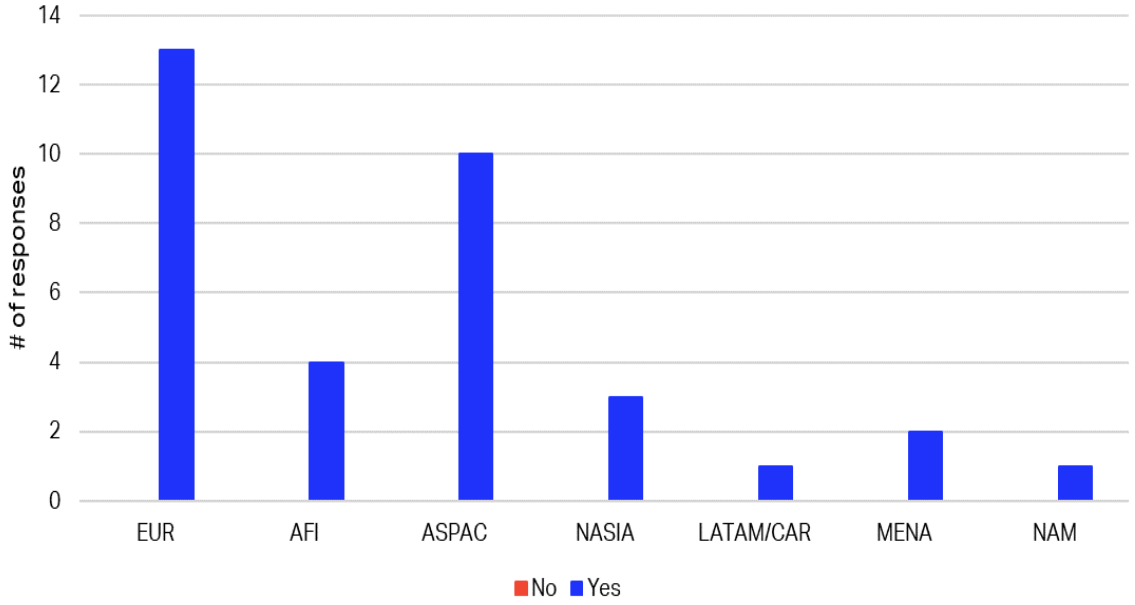
- Yes 34
- No 0

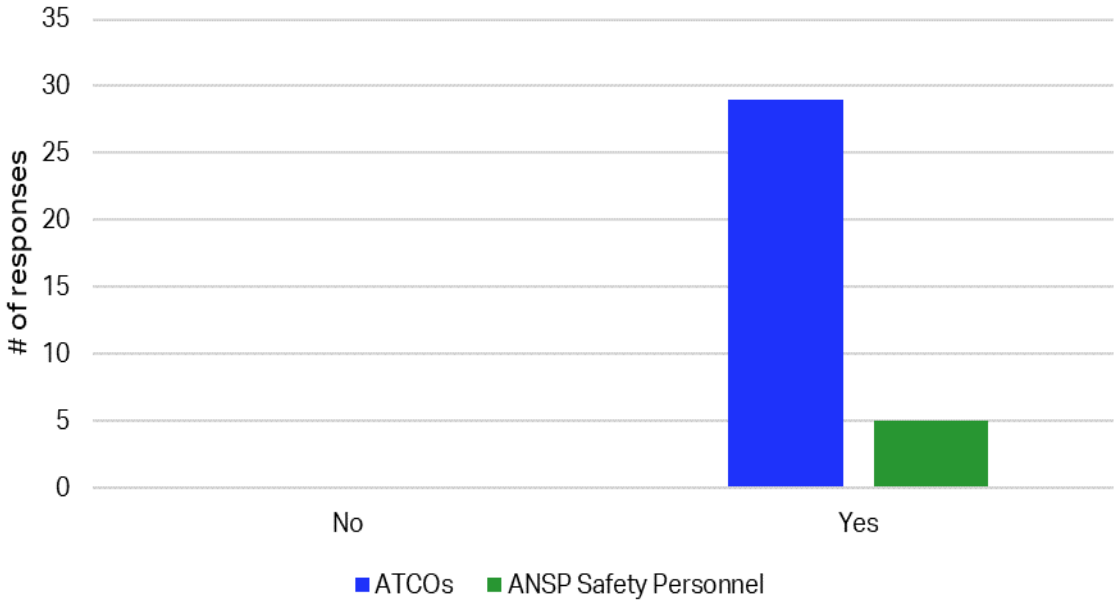


100% of the respondents who are familiar with the GM (34) agree that the GM helped them to better understand the factors that lead to unstable approaches

Comparison: 96% of the pilots and airline safety personnel who are familiar with the GM (537) agree that the GM helped them to better understand the factors that lead to unstable approaches

Question 41: The GM helped me to better understand the factors that lead to UA

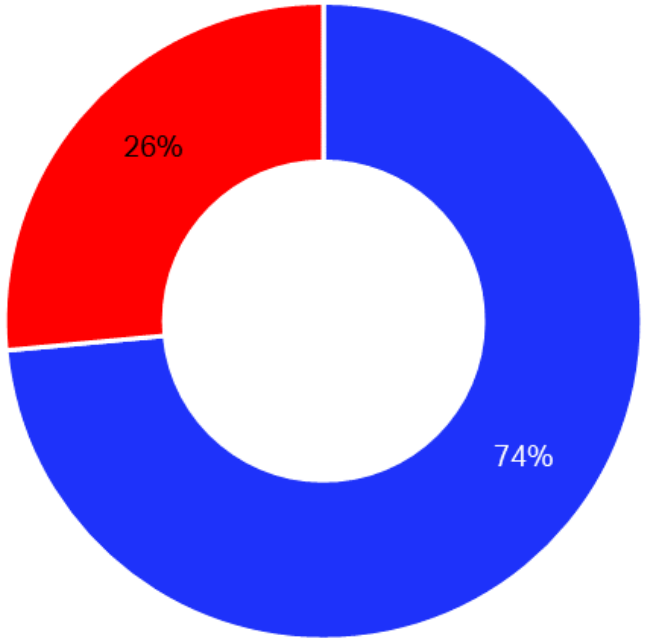




All respondents confirmed that the GM helped them to better understand the factors that lead to UA

Question 42: In my organization, we have implemented practices from the GM to mitigate the risk of unstable approaches

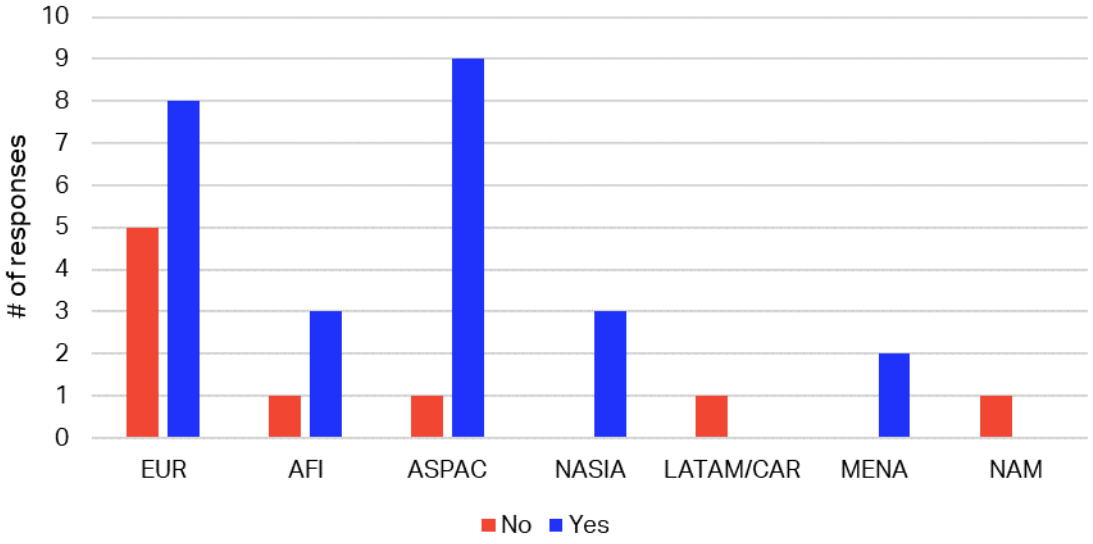
- Yes 25
- No 9

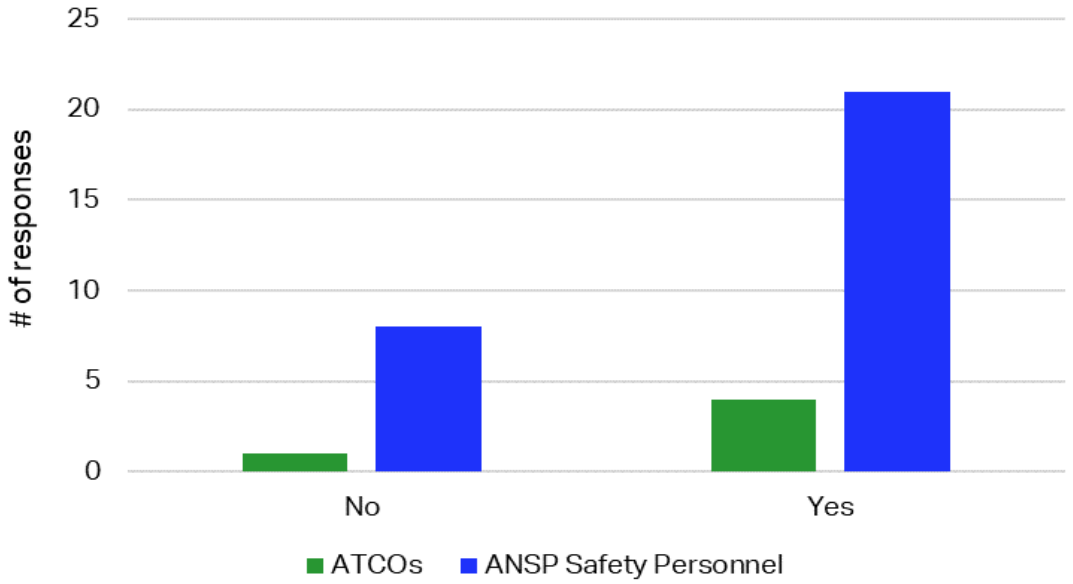


74% of the respondents who are familiar with the GM (34) implemented practices from the GM to mitigate the risk of unstable approaches

95% of the pilots and airline safety personnel who are familiar with the GM (537) implemented practices from the GM to mitigate the risk of unstable approaches

Question 42: In my organization, we have implemented practices from the GM to mitigate the risk of unstable approaches

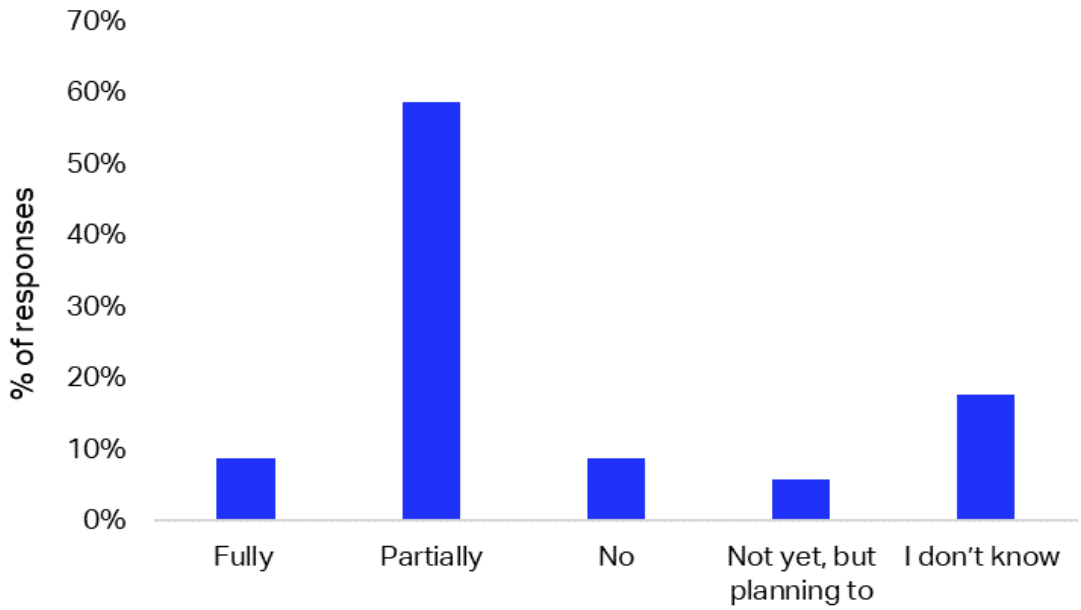




All respondents who are familiar with the GM and are based in NASIA and MENA confirmed that their organizations have implemented practices from the GM. In contrary to the pilot and airline responses, LATAM and NAM advised that their organizations have not yet implemented the practices. 20% of ATC and 17% of ANSP Safety Personnel have not yet implemented practices from the GM

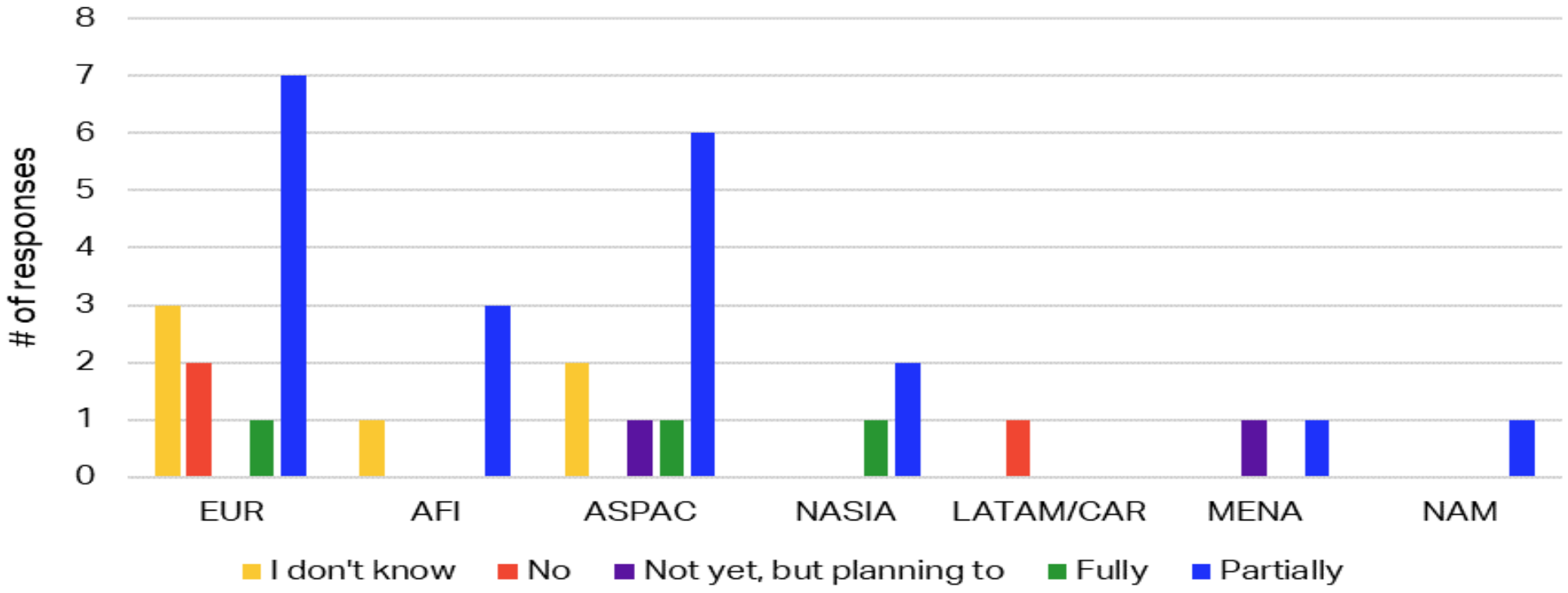
Question 43: In my organization, we have adopted the recommendations of the GM

- Fully 3
- Partially 20
- No 3
- Not yet, but planning to 2
- I don't know 6



59% of the respondents who are familiar with the GM (34) adopted partially the recommendations provided in the GM

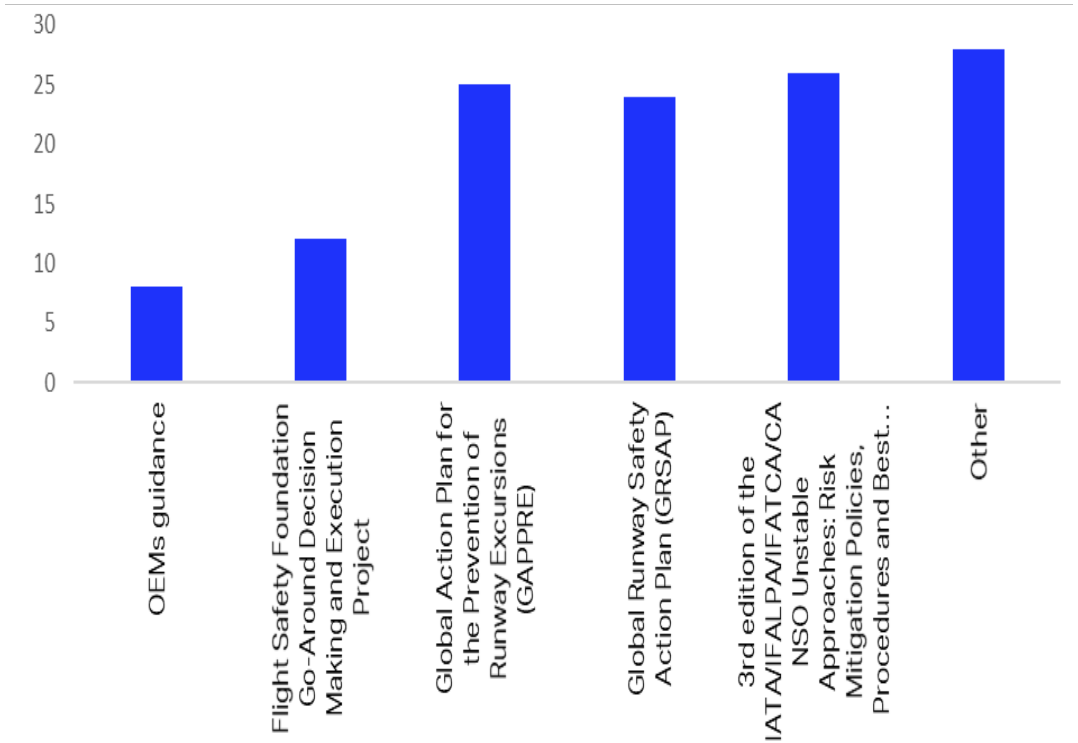
Question 43: In my organization, we have adopted the recommendations of the GM



100% of LATAM ATCOs and ANSP Safety Personnel and 15% of the European based respondents have not adopted any of the recommendations

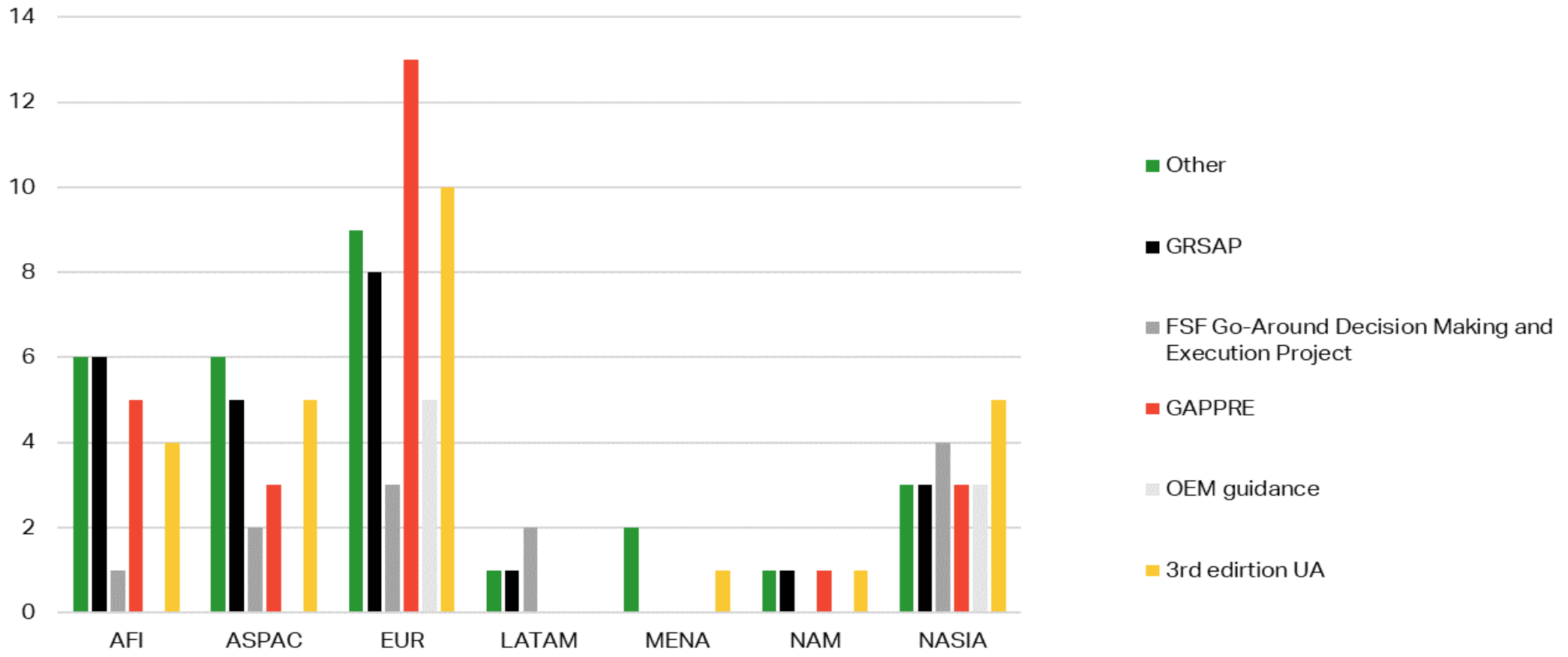
Question 44: In my organization, what best practices do you follow regarding stable approaches?

- OEMs guidance 8
- Flight Safety Foundation Go-Around Decision Making and Execution Project 12
- Global Action Plan for the Prevention of Runway Excursions (GAPPRE) 25
- Global Runway Safety Action Plan (GRSAP) 24
- 3rd edition of the IATA/IFALPA/IFATCA/CANSO Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices 3rd Edition GM 26
- Other 28



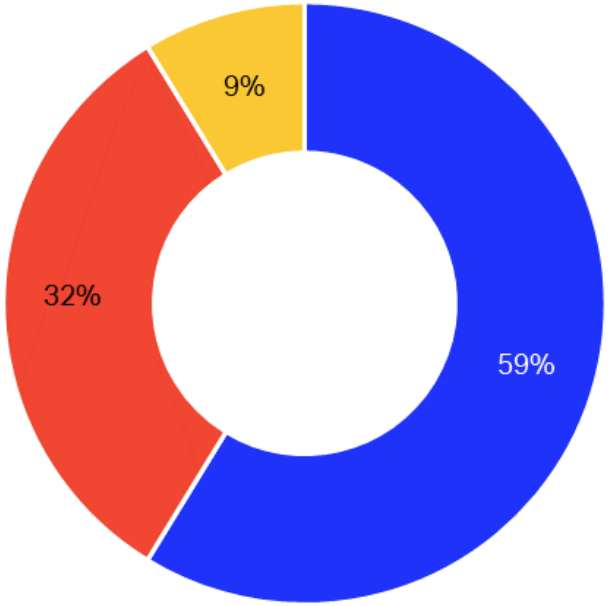
The 34 had the capability to select more than one answer. The majority selected "Other"

Question 44: In my organization, what best practices do you follow regarding stable approaches?



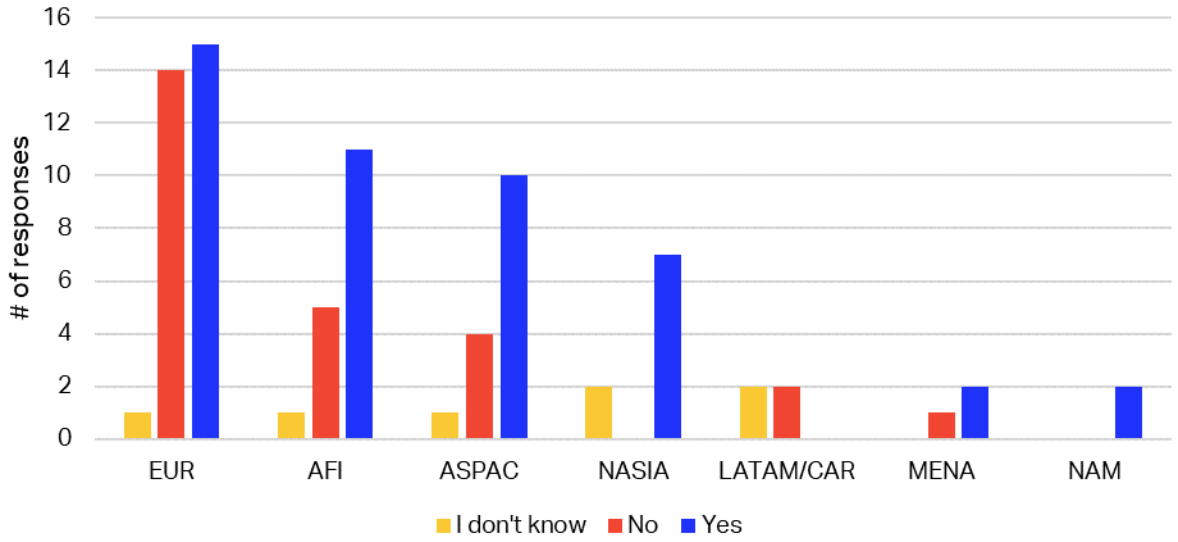
Question 45: In my organization, ATCOs are provided with clear procedures (Manual of Air Traffic Services, local Operation Manual(s), Letters of Agreement (LoAs), etc.) on how to identify, notify and/or react to an unstable approach

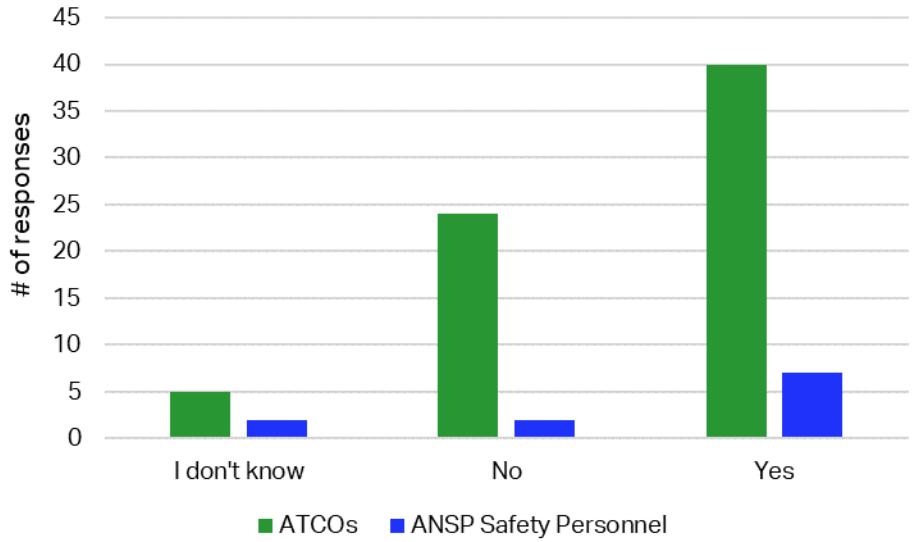
- Yes 47
- No 26
- I don't know 7



The 34 had the capability to select more than one answer. 32% are provided with clear procedures (Manual of Air Traffic Services, local Operation Manual(s), LoAs on how to identify, notify and/or react to an unstable approach

Question 45: In my organization, ATCOs are provided with clear procedures (Manual of Air Traffic Services, local Operation Manual(s), Letters of Agreement (LoAs), etc.) on how to identify, notify and/or react to an unstable approach

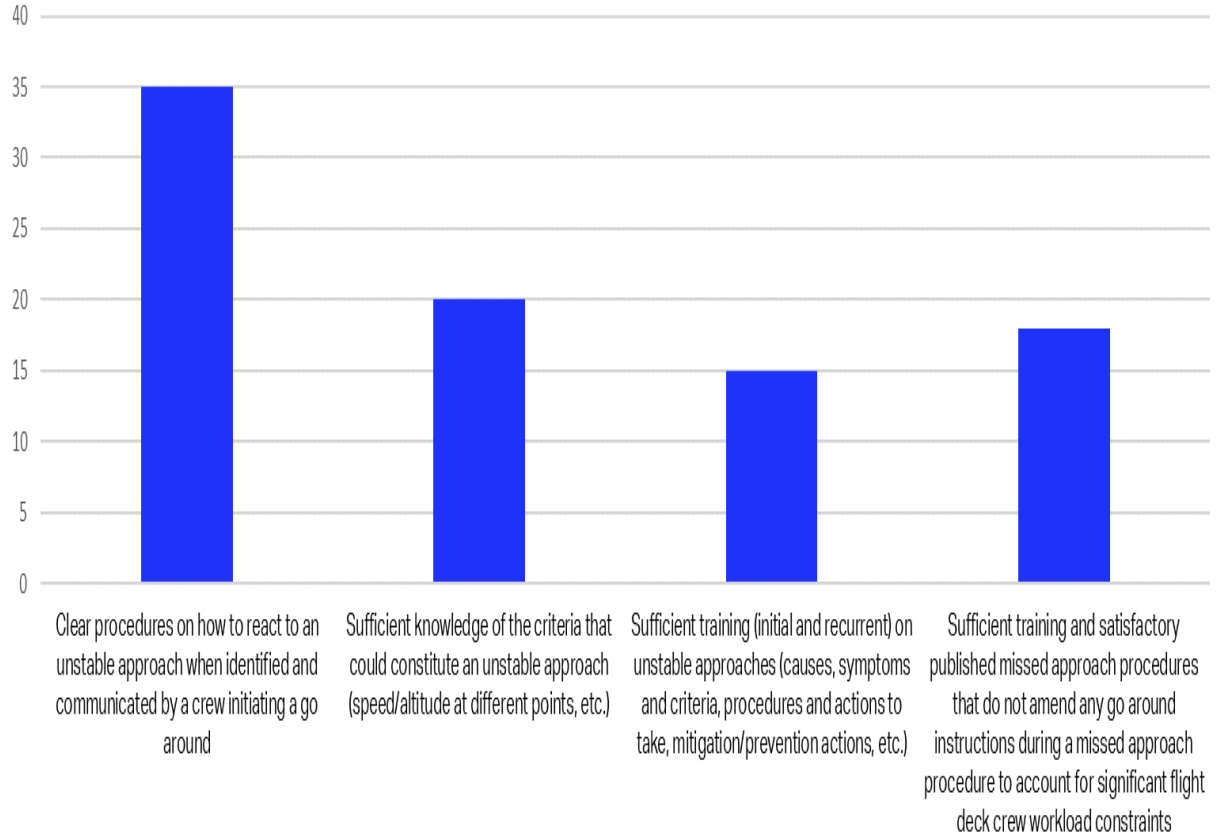




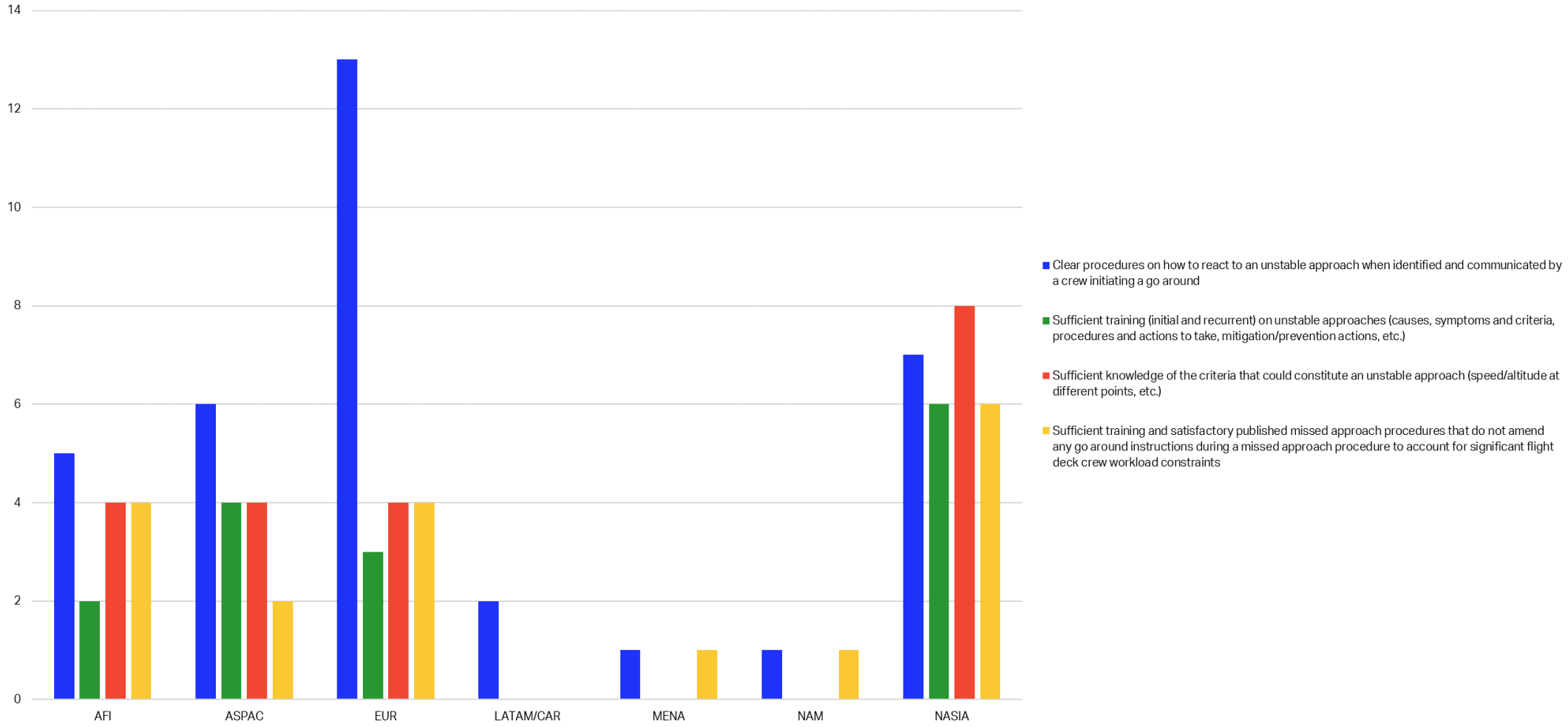
50% of EUR, 65% of AFI, 67% of ASPAC, 78% of NASIA, 67% of MENA and 100% of NAM respondents have confirmed that their organizations provide them with clear procedures (Manual of Air Traffic Services, local Operation Manual(s), LoAs on how to identify, notify and/or react to an unstable approach

Question 46: If you answered "Yes" to the previous question, do you (ATCOs) have:

- Clear procedures on how to react to an unstable approach when identified and communicated by a crew initiating a go around — 35
- Sufficient knowledge of the criteria that could constitute an unstable approach (speed/altitude at different points, etc.) — 20
- Sufficient training (initial and recurrent) on unstable approaches (causes, symptoms and criteria, procedures and actions to take, mitigation/prevention actions, etc.) — 15
- Sufficient training and satisfactory published missed approach procedures that do not amend any go around instructions during a missed approach procedure to account for significant flight deck crew workload constraints — 18

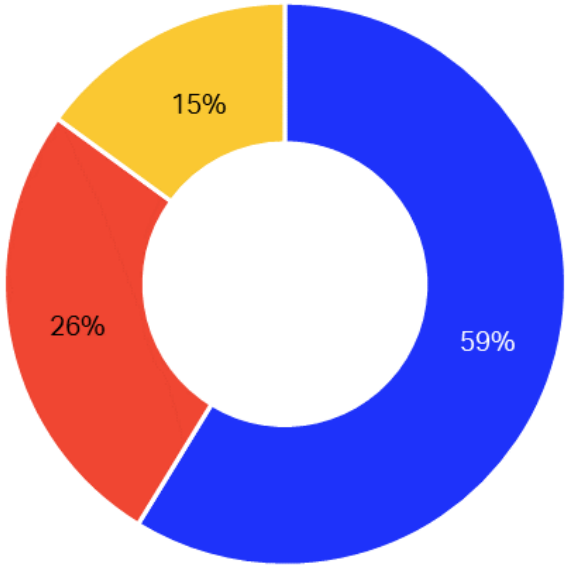


Question 46: If you answered "Yes" to the previous question, do you (ATCOs) have:



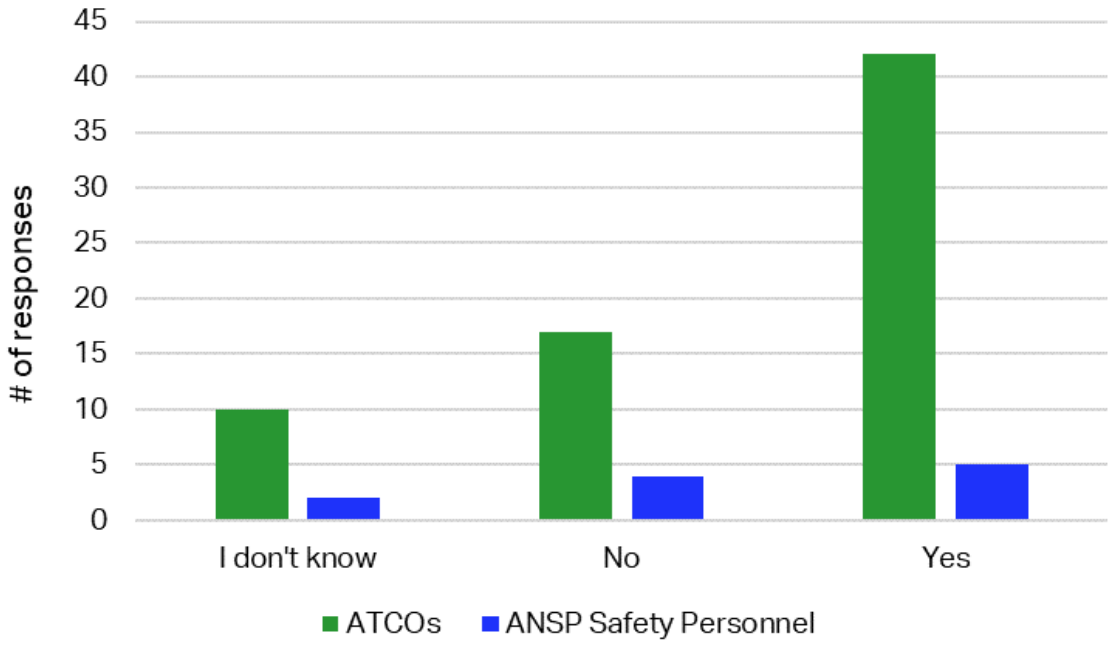
Question 47: In my organization, we track unstable approaches performance

- Yes 47
- No 21
- I don't know 12

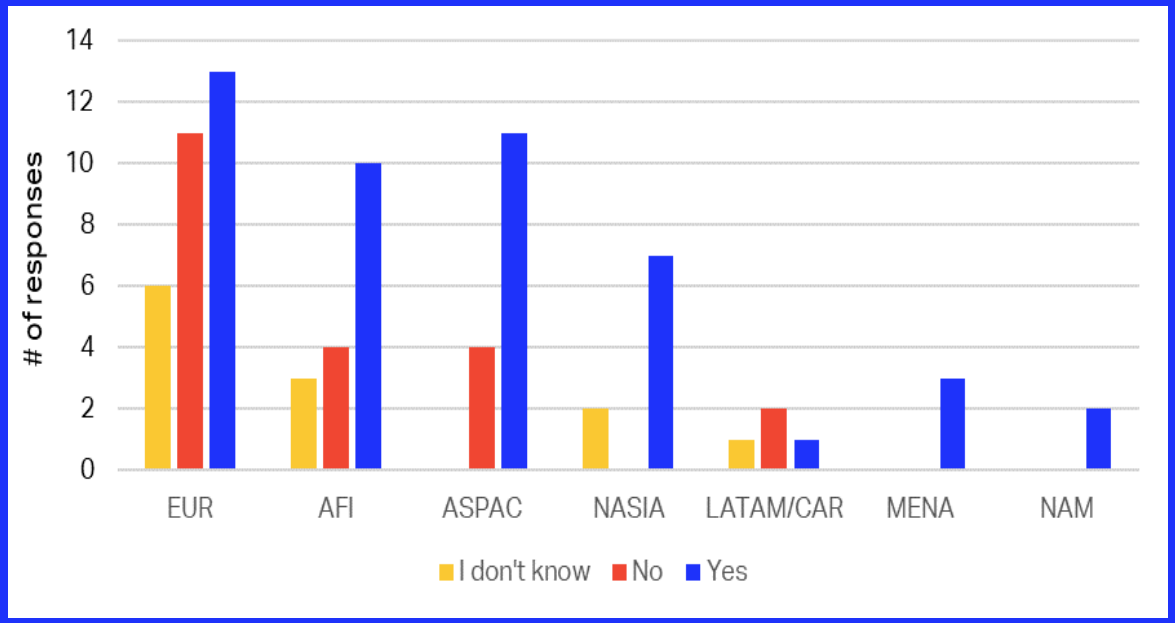


59% of the respondents track Unstable Approaches performance

Question 47: In my organization, we track unstable approaches performance



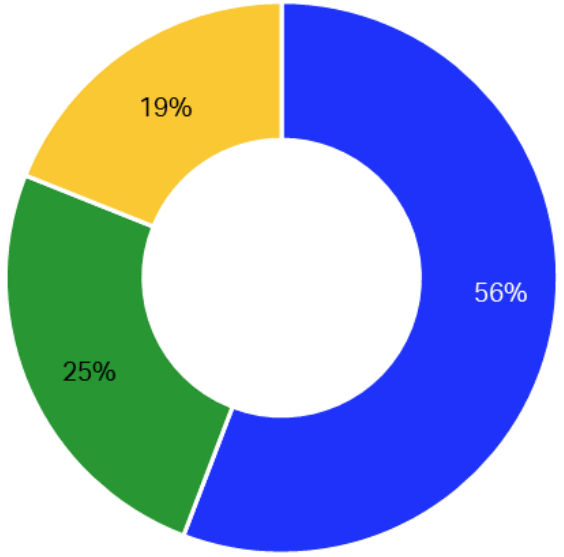
26% of the ATCOs and ANSP Safety Personnel do not track unstable approaches



67% of the ATCOs and ANSP Safety Personnel based in LATAM/CAR do not track unstable approaches

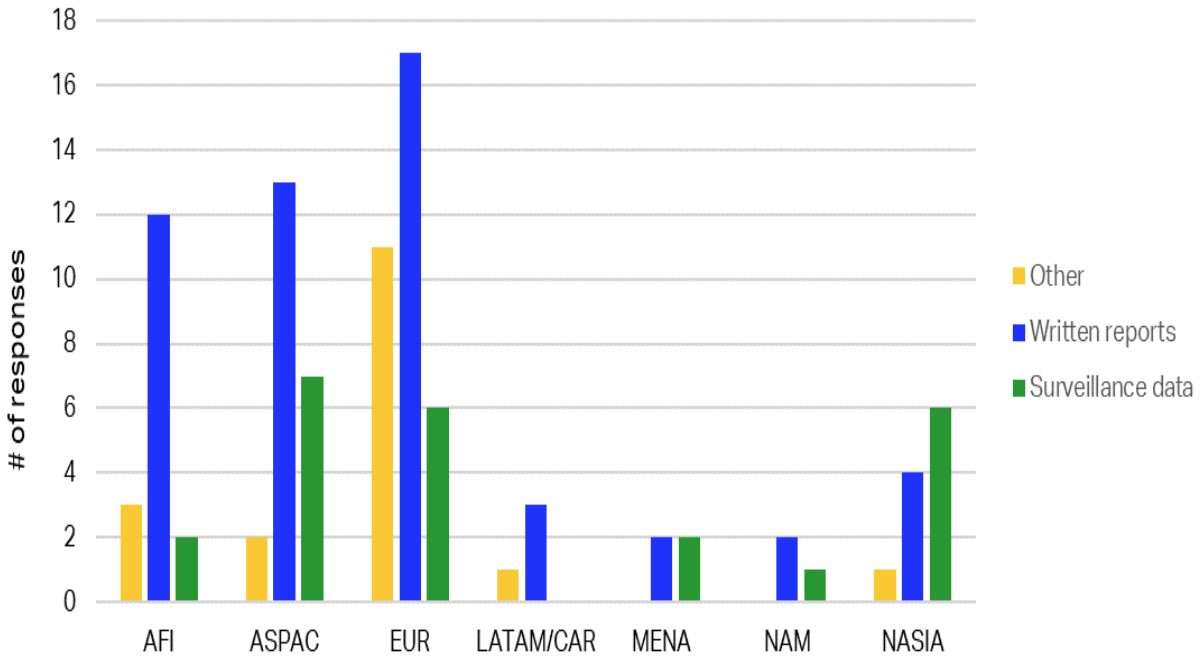
Question 48: If you answered yes to the previous question, what tools are used to track unstable approach performance?

- Written reports 53
- Surveillance data 24
- Other 18

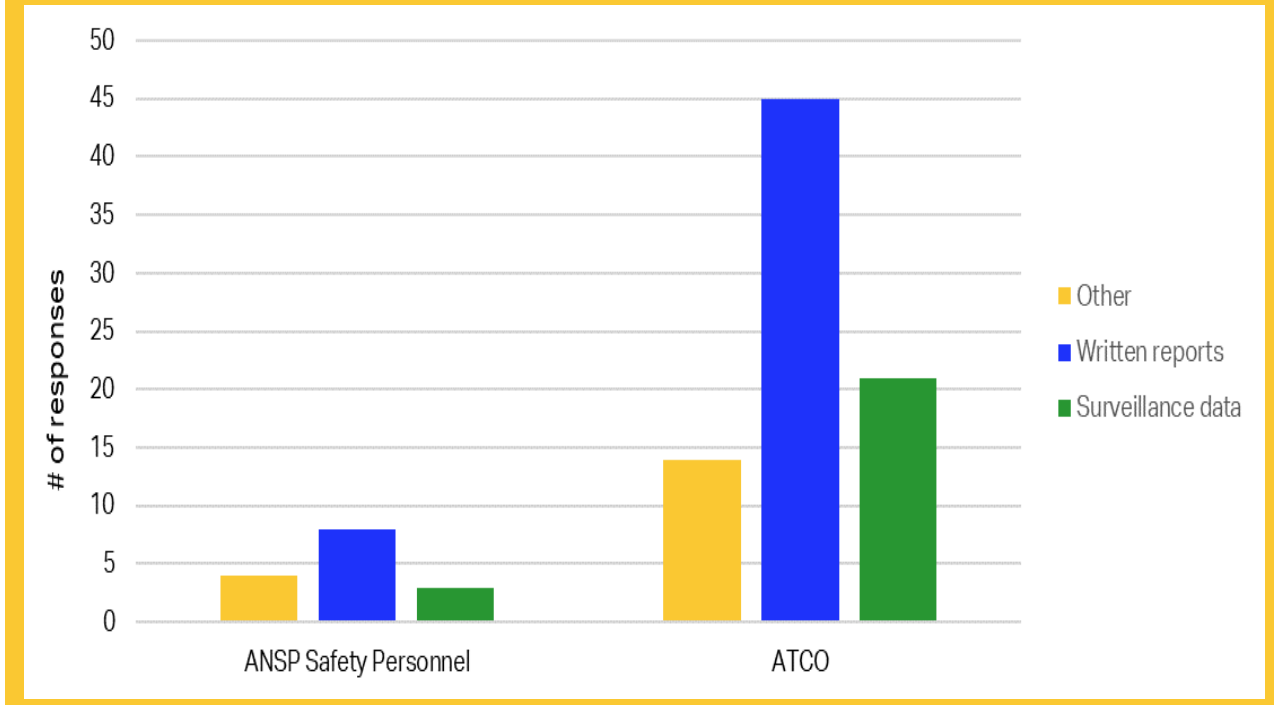


56% of the respondents use written reports to track Unstable Approaches performance

Question 48: If you answered yes to the previous question, what tools are used to track unstable approach performance?



The survey results show that the tool that is used to track UAs in EUR, ASPAC, AFI, and LATAM/CAR is written reports. In NASIA, the tool that is used the most is Surveillance data



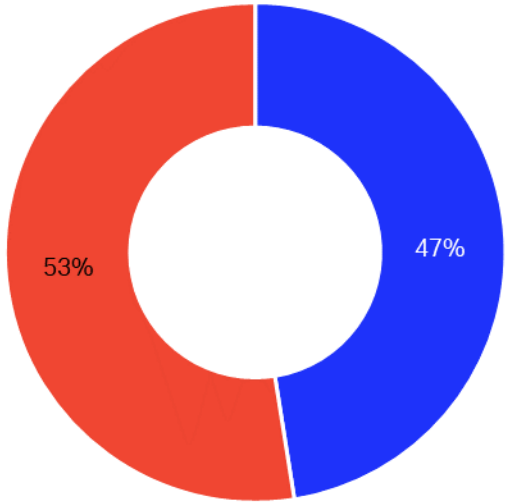
The tool that is mostly used by ATCOs and ANSP Safety Personnel is Written reports followed by surveillance data

Question 49: If you answered "Other" in the previous question, please specify

- Interviews with flight crews and ATCOs
- Incident and ATS Occurrence reports
- The procedure of ATC operation

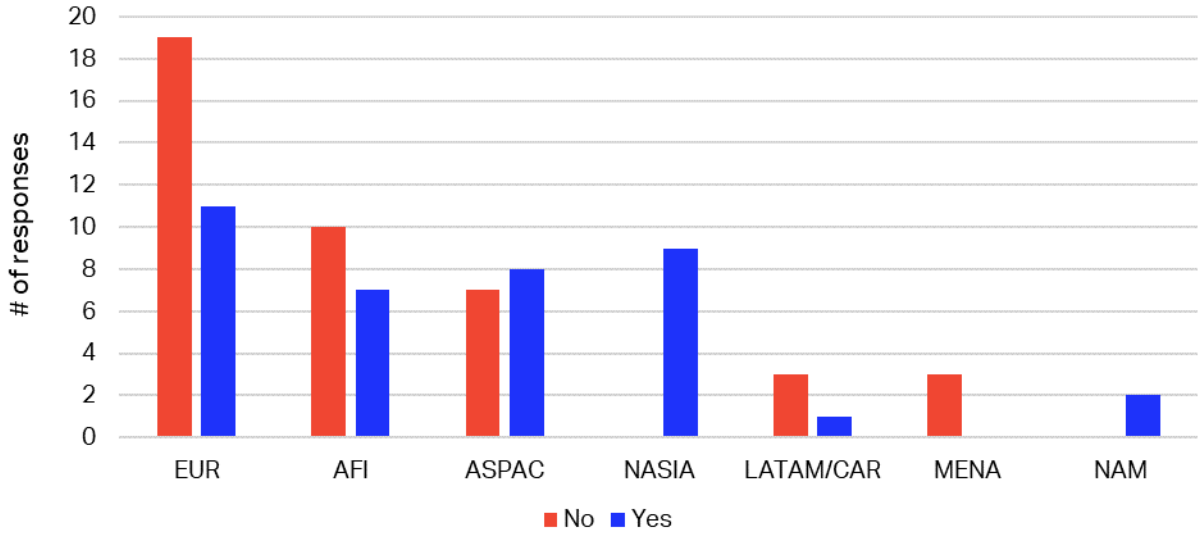
Question 50: In my organization, we work with pilots and operators to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

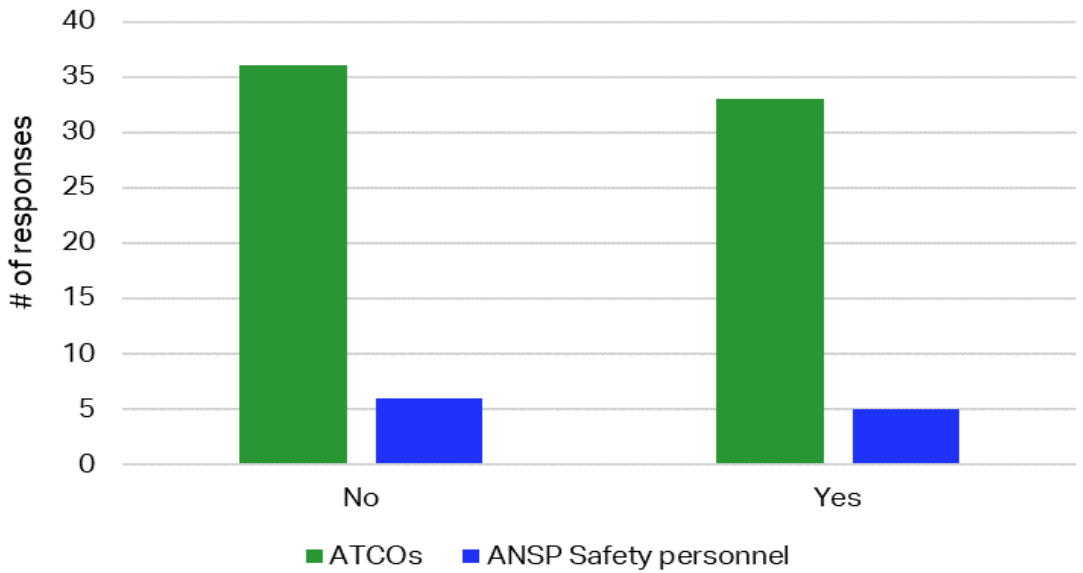
- Yes 38
- No 42



47% of the respondents work with pilots and operators to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

Question 50: In my organization, we work with pilots and operators to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

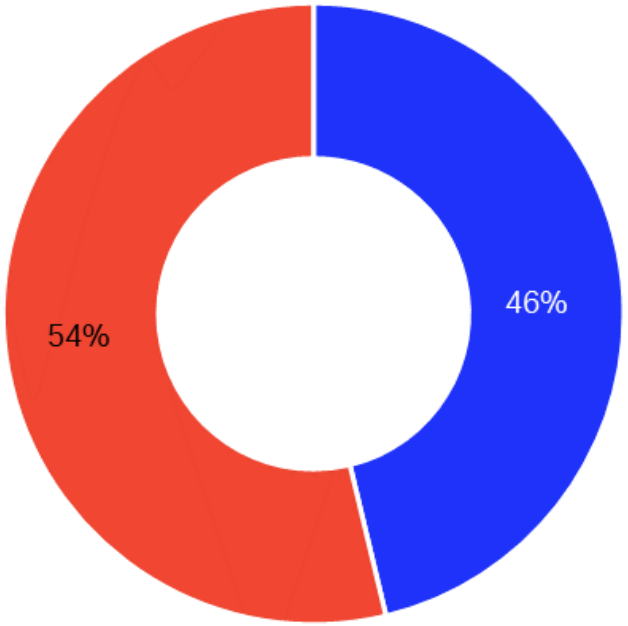




37% of EUR, 41% of AFI, 53% of ASPAC, 100% of NASIA, 25% of LATAM/CAR, and 100% of NAM respondents confirmed that their organizations do work with pilots and operators to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

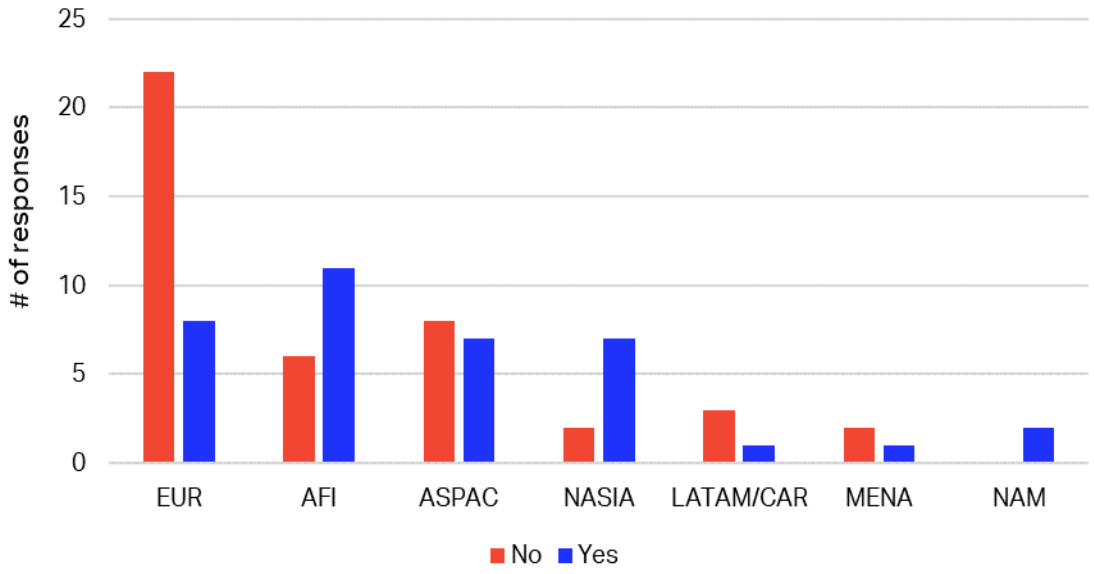
Question 51: In my organization, we work with other service providers and regulators to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

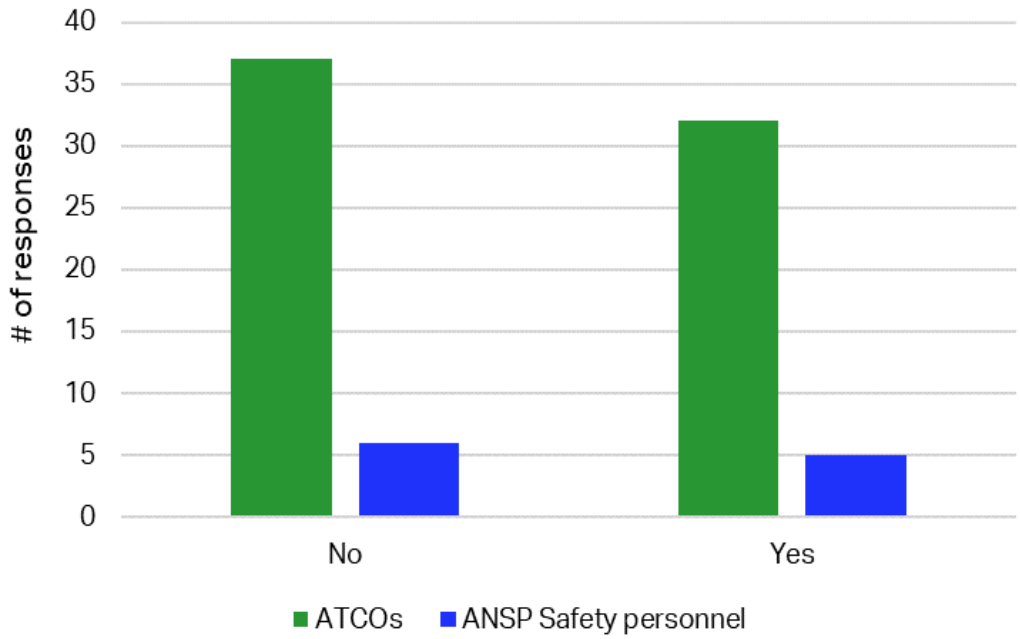
- Yes 37
- No 43



46% of the respondents work with other service providers & regulators to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

Question 51: In my organization, we work with other service providers and regulators to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk





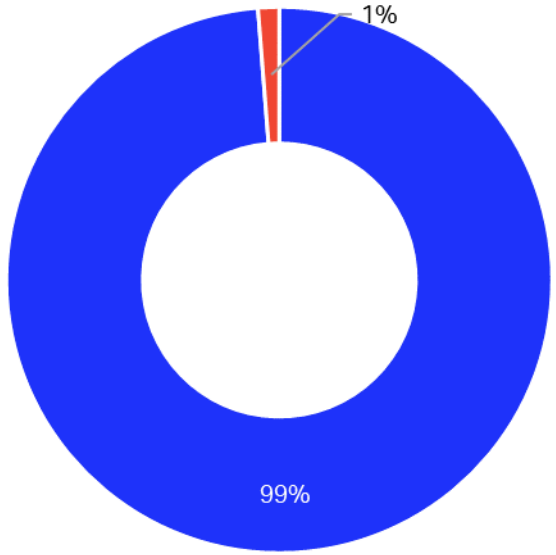
27% of EUR, 65% of AFI, 47% of ASPAC, 78% of NASIA, 25% of LATAM/CAR, 33% of MENA and 100% of NAM respondents confirmed that their organizations work with other service providers and regulators to implement procedural changes to systematically reduce the rate of UA at runways identified as higher risk

Insight (Questions 50 & 51)

- Of the 38 responses:
  - 76% work with pilot & operators as well as with other service providers & regulators
  - 24% who work only with pilots and operators, do not work with other service providers and regulators
- Of the 37 responses
  - 22% who work with regulators & other service providers, do not work with pilots & operators
- Of the 34 responses that do not work with regulators
  - Out of the 34, 79% of which do not work with pilots and operators

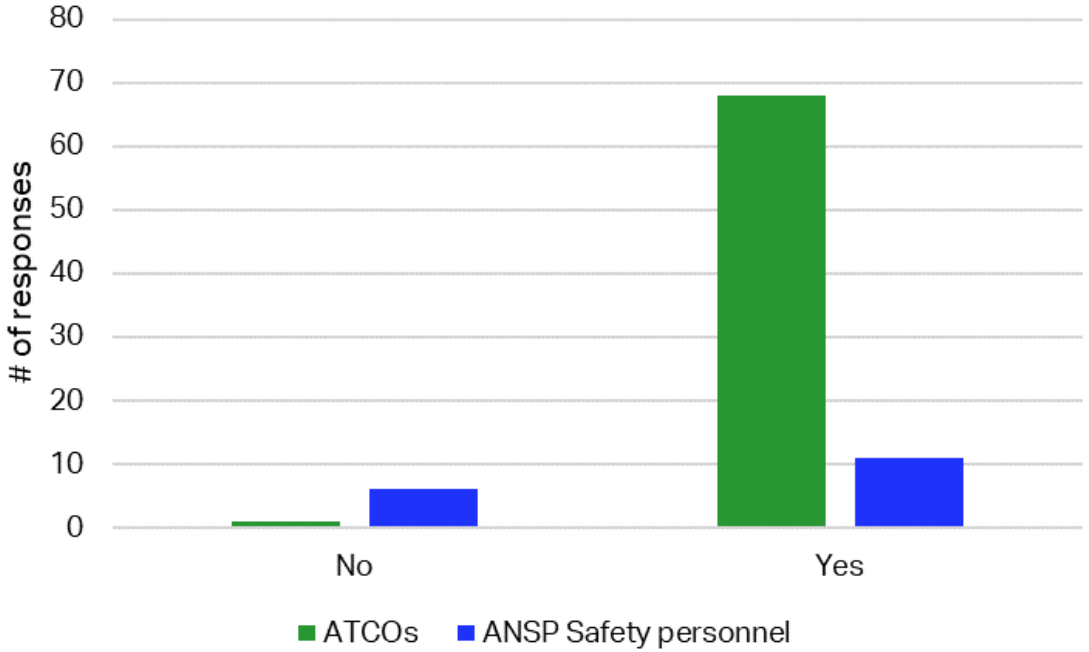
Question 52: Do you provide pilots information on a given approach/descent profile (e.g. weather conditions, windshear, delays, pilot reports (PIREPs) from previous aircraft, turbulence orographic activity as with microbursts)?

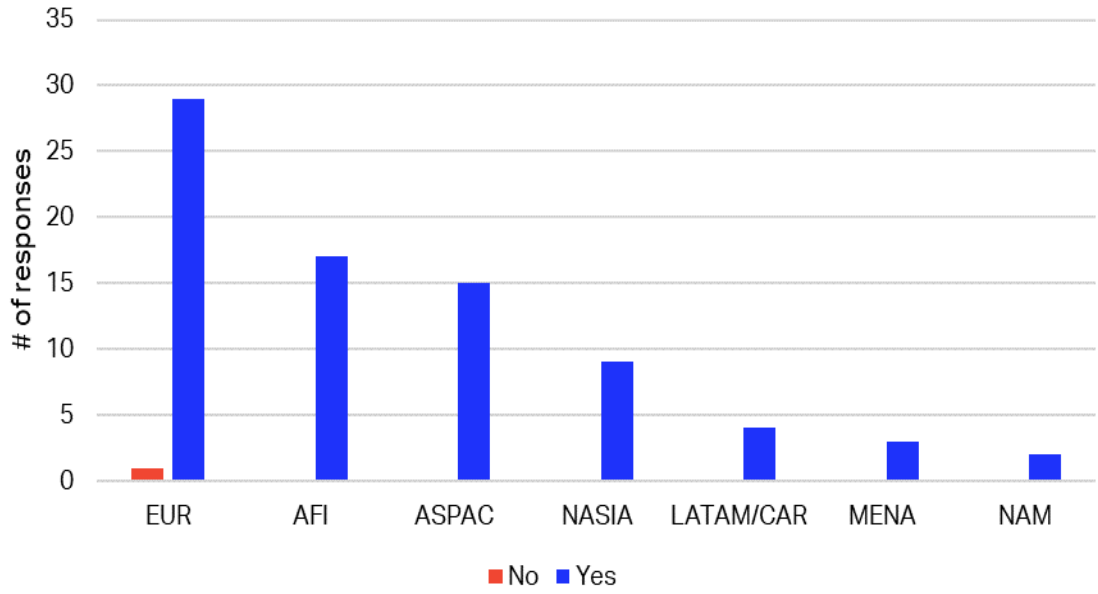
- Yes 79
- No 1



99% of the ATCOs and ANSP Safety Personnel confirmed that they provide pilots with information on a given approach/descent profile

Question 52: Do you provide pilots information on a given approach/descent profile (e.g. weather conditions, windshear, delays, pilot reports (PIREPs) from previous aircraft, turbulence orographic activity as with microbursts)?



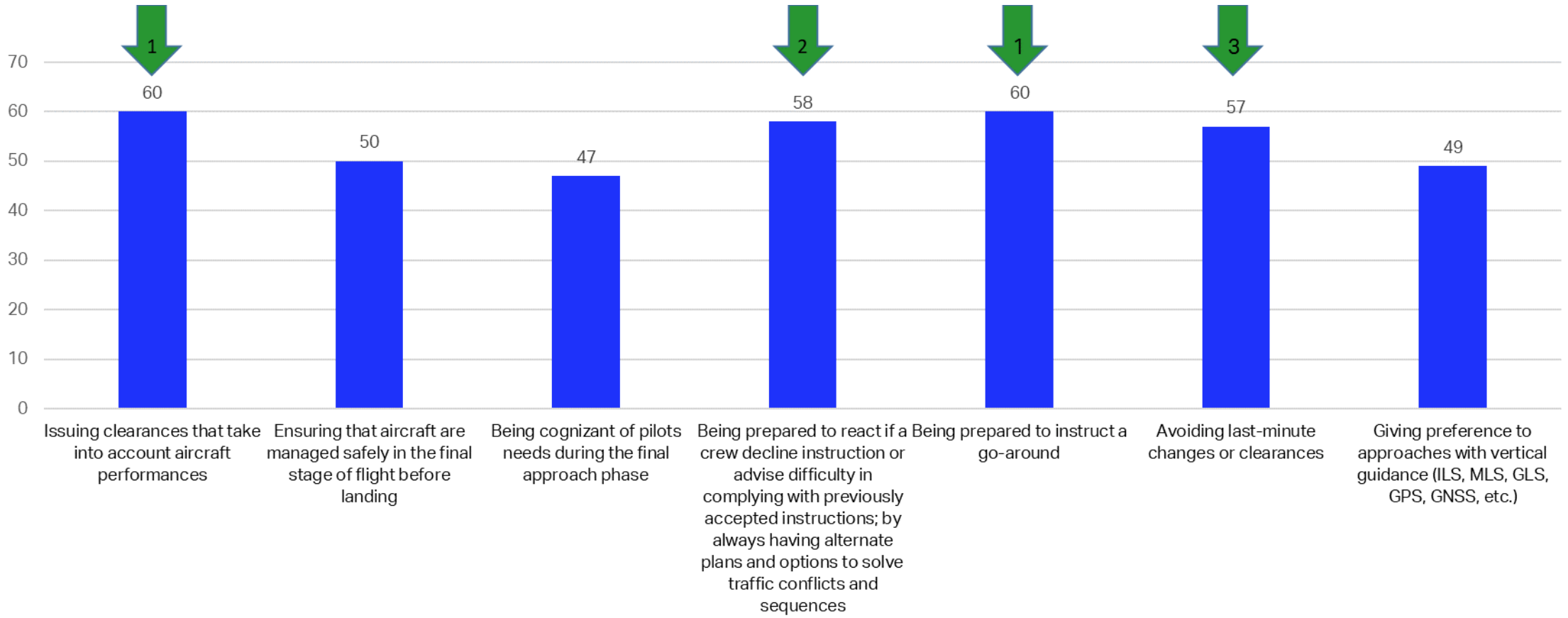


97% of EUR and the rest of the respondents confirmed that they provide pilots with information on a given approach/descent profile from previous aircraft, turbulence orographic activity as with microbursts

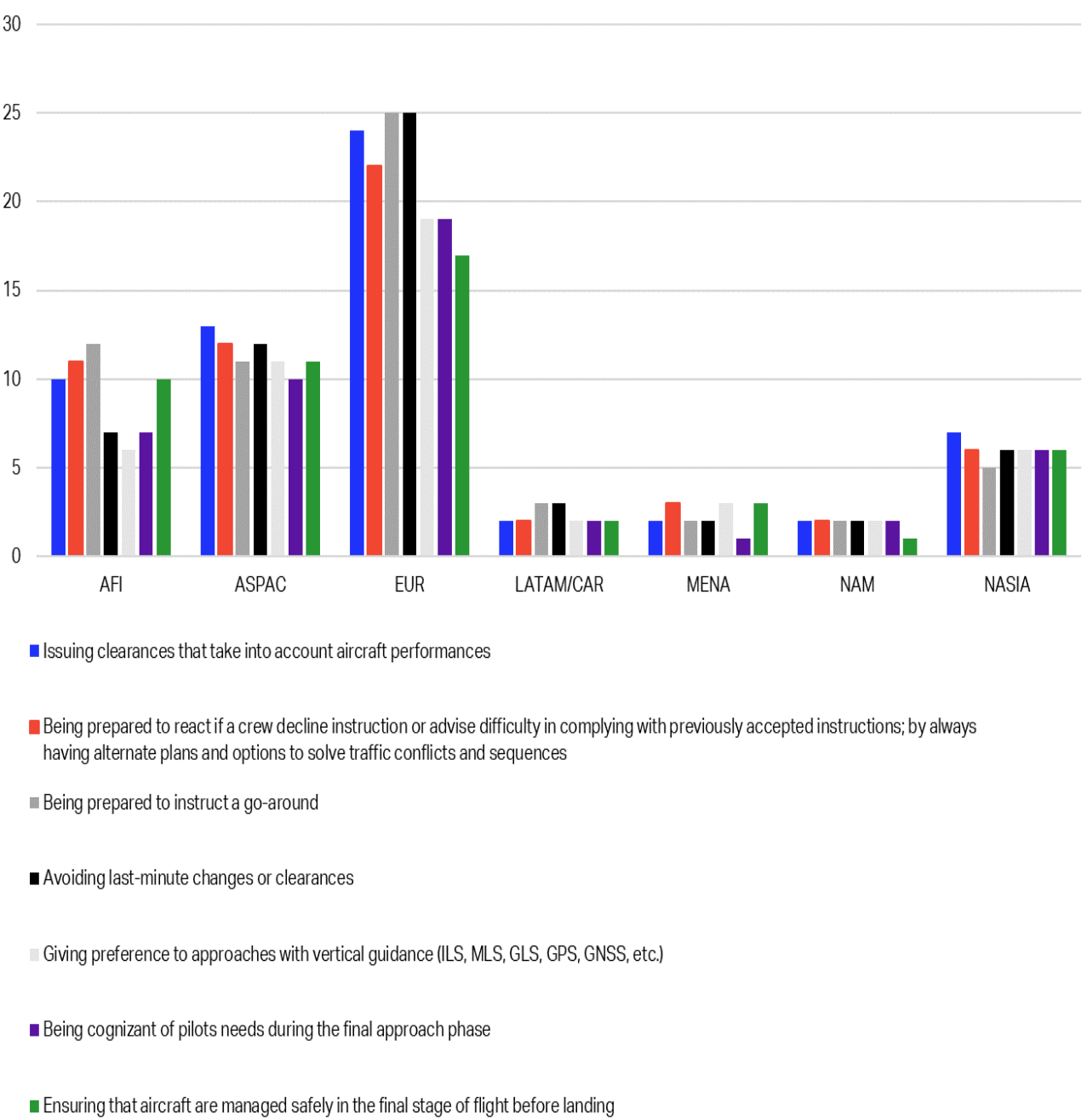
Question 53: If you answered "No" in the previous question, please specify the reason

No Reason was provided

Question 54: As an ATCO, do you contribute to stable approaches by (please select all that apply)

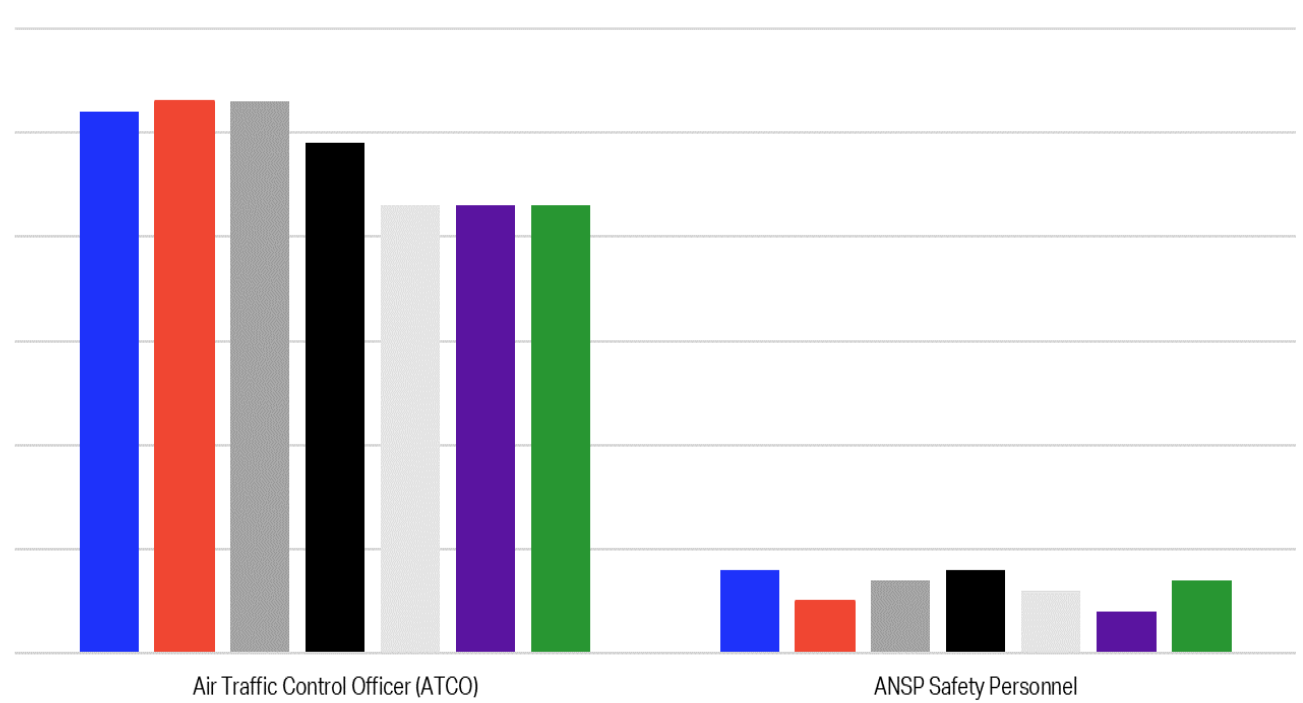


Question 54: As an ATCO, do you contribute to stable approaches:



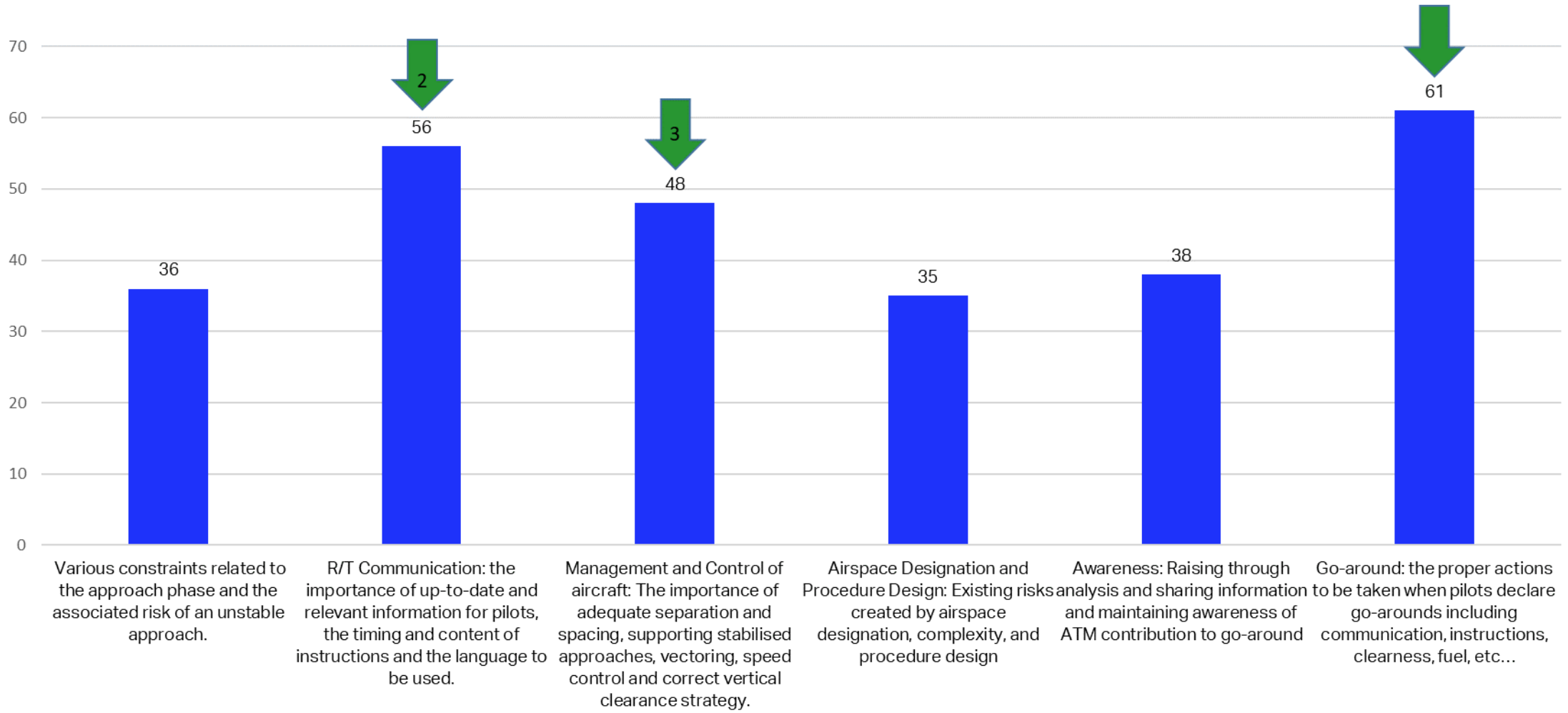
The elements that ATCOs use differ from one region to another. ATCOs based in AFI, EUR and LATAM/CAR for example identified their contribution by being prepared to instruct a go-around. While the contribution of ATCOs based in NASIA and ASPAC is by ensuring that aircraft managed safely in final stage of flight

Question 54: As an ATCO, do you contribute to stable approaches:

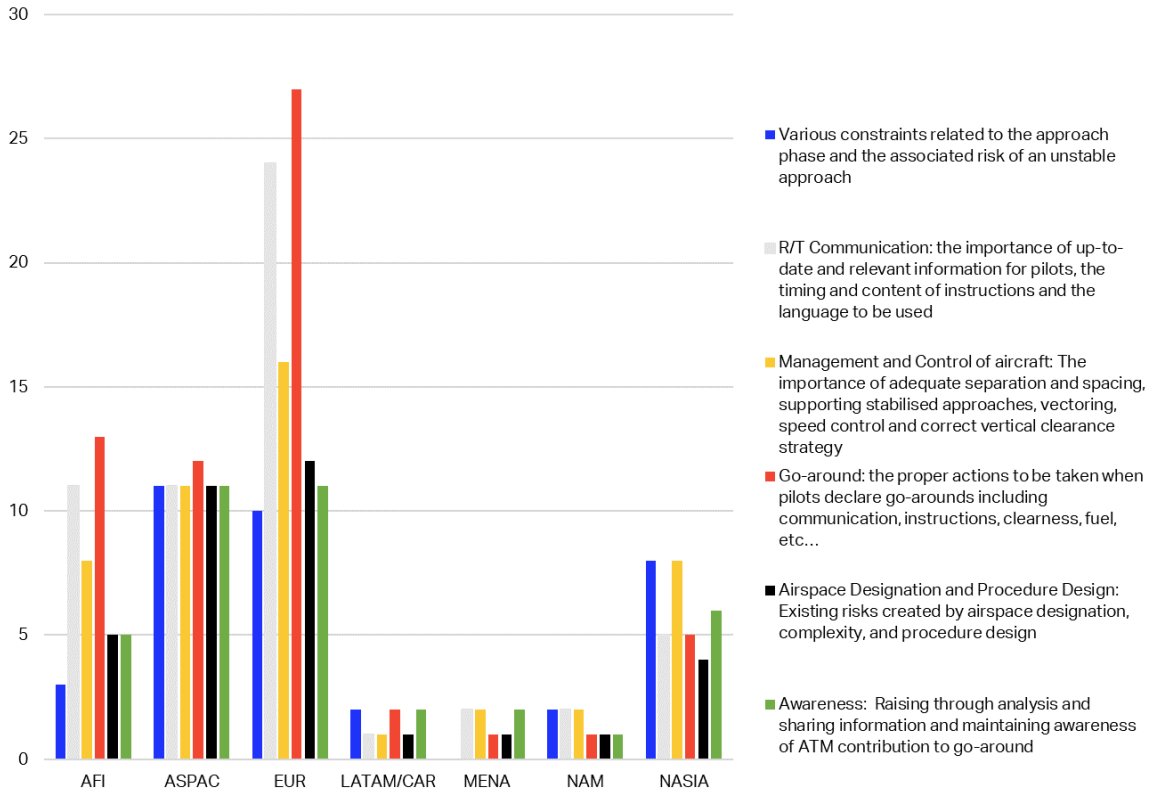


ATCOs were asked to select all applicable elements that contribute towards stable approaches. The highest was that ATCOs are prepared to react if a crew decline instruction or advise difficulty in complying with previously accepted instructions and by always having alternate plans and options to solve traffic conflicts and sequences, followed by being prepared to instruct a go-around followed by issuing clearances that respect aircraft performances

Question 55: As an ATCO, are you given training on risks of unstable approaches, does your training includes the following:



Question 55: As an ATCO, are you given training on risks of unstable approaches, does your training includes the following:



Different regions have different training emphases. Go-around: the proper actions to be taken when pilots declare go-arounds including communication, instructions, clearness, fuel, etc… is the highest selection among ATCOs based in AFI, ASPAC, EUR

Question 55: As an ATCO, are you given training on risks of unstable approaches, does your training includes the following:

- **The highest offered training from ATCOs' perspective is on Go-around: the proper actions to be taken when pilots declare go-arounds including communication, instructions, clearness, fuel, etc…, followed by R/T Communication: the importance of up-to-date and relevant information for pilots, the timing and content of instructions and the language to be used.**
- **The least training offered from ATCOs' point of view is on airspace and procedure design training**