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De-mystifying Safety Culture in Aviation and the science of measuring it.

Use case in an Aircraft Operator

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ABSTRACT

This study presents findings from a collaborative analysis between SIRIO, a Business Aviation Aircraft Operator, and EUROCONTROL aimed at enhancing Safety Culture within the aviation sector. Leveraging EUROCONTROL's Safety Culture Survey as the primary analytical tool, the study offers a comprehensive examination of the factors influencing Safety Culture within the organization. Through a combination of quantitative data analysis and qualitative insights, the research explores the perceptions, attitudes, and behaviours across the organization. In addition to the possibility of analysing the Safety Culture of the involved operator, a key focus area is to validate the applicability of the EUROCONTROL Safety Culture Questionnaire beyond its original scope of application (ANSPs) by extending it to airline operators. The validation will occur through the application of the survey to the mentioned airline operator, the study of the obtained results, and the review of previous literature. By identifying strengths and areas for improvement, the study provides actionable recommendations for assessing and fostering a robust Safety Culture in the Aircraft Operator and Maintenance Organization domain. The collaborative nature of the analysis underscores the importance of industry partnerships in promoting Safety excellence. The insights gained from this study have broader implications for enhancing Safety Culture across the aviation sector and contribute to ongoing efforts to elevate Safety standards within the industry.

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1 INTRODUCTION

Safety Culture represents a foundation of the aviation industry, embodying the shared values, attitudes, and behaviours that collectively influence Safety performance within organizations. Safety Culture is the way Safety is perceived, valued and prioritised in an organisation. It reflects the real commitment to Safety at all levels in the organisation. It has also been described as "how an organisation behaves when no one is watching". It is a dynamic and multifaceted concept that goes beyond mere compliance with rules and regulations, encompassing the collective beliefs, norms, and practices that shape the way Safety is perceived, valued, and managed within an organization.

Within the aviation sector, Safety Culture is recognized as a critical determinant of Safety outcomes, playing a pivotal role in accident prevention and risk mitigation. It encompasses not only the technical aspects of Safety management but also the human factors and organizational dynamics that influence decision-making and behaviour. A strong Safety Culture fosters a proactive approach to Safety, where individuals are empowered to identify and address potential hazards, communicate openly about Safety concerns, and continuously strive for improvement.

In recent years, there has been a growing recognition of the critical role that Safety Culture plays in ensuring the safe and efficient operation of aircraft. As aviation systems become increasingly complex and interconnected, the need to understand and assess Safety Culture has become paramount. By proactively identifying potential Safety hazards, addressing underlying organizational weaknesses, and fostering a proactive Safety mindset, organizations can mitigate risks and enhance overall Safety performance.

Measuring and analysing Safety Culture is essential for several reasons. Firstly, it provides insights into the prevailing attitudes and behaviours towards Safety within an organization, highlighting areas of strength and areas for improvement. Secondly, it enables organizations to identify potential Safety risks and vulnerabilities before they escalate into serious incidents or accidents. Thirdly, it

facilitates benchmarking against industry standards and best practices, allowing organizations to track their progress over time and compare their performance with peers. Finally, by promoting a culture of transparency, accountability, and continuous improvement, measuring Safety Culture helps to foster a proactive Safety mindset among employees, leading to a safer and more resilient aviation system overall.

In this article, we utilize the case study of an Aircraft Operator and Maintenance Organization, analysing it through the lens of the Safety Culture Survey tool developed by EUROCONTROL. This tool has been extensively studied, tested, and implemented by Air Traffic Management (ATM) organizations across Europe.

It is important to note that the intention of this paper is not to evaluate the specific Questionnaire Results or Safety Performance of Sirio SPA or any other individual organization. Rather, the objective is to assess whether the Safety Culture Questionnaire, previously applied primarily to Air Navigation Service Providers (ANSPs), can be validated and thus extended for use in evaluating Safety Culture within Aircraft Operators.

This underscores the broader aim of this study, which is to investigate the adaptability and effectiveness of the EUROCONTROL Safety Culture Questionnaire beyond its traditional application in ANSPs. While our analysis focuses on a specific Aircraft Operator and Maintenance Organization, the overarching goal is to assess the suitability of the survey tool for evaluating Safety Culture within various aviation sectors, including aircraft operators. This broader applicability of the tool holds significant implications for enhancing Safety management practices across the aviation industry.

1.1 ORGANIZATIONS INVOLVED

In this section, we provide a comprehensive overview of the two key organizations involved in the research process: EUROCONTROL and SIRIO SPA.

EUROCONTROL, formally known as the European Organization for the Safety of Air Navigation, holds a prominent position within the European aviation landscape. Established in 1960 as an intergovernmental organization, EUROCONTROL operates collaboratively with its 41 member states to ensure the Safety, efficiency, and sustainability of air traffic management (ATM) across Europe. With its headquarters in Brussels, Belgium, EUROCONTROL plays a pivotal role in harmonizing ATM operations, facilitating the seamless flow of air traffic, and enhancing Safety standards throughout the region.

At the core of EUROCONTROL's mission is the promotion of a safe, efficient, and sustainable aviation system. The organization is committed to fostering a positive Safety Culture within the aviation industry, recognizing it as a cornerstone of effective Safety management. To achieve this goal, EUROCONTROL spearheads various initiatives and projects aimed at enhancing Safety Culture awareness and assessment.

One notable contribution of EUROCONTROL in this regard is the development of the Safety Culture Survey. This survey, meticulously crafted through extensive research and collaboration with industry stakeholders, serves as a robust assessment tool tailored specifically for evaluating Safety Culture within aviation organizations. The Safety Culture Survey encompasses a comprehensive set of questions and metrics designed to assess various Dimensions of Safety Culture, including organizational commitment to Safety, communication effectiveness, leadership behaviours, and employee perceptions of Safety management practices. Widely recognized and adopted within the aviation community, the Safety Culture Survey has become a benchmark for Safety Culture assessment endeavours, facilitating organizations in identifying areas for improvement and fostering a proactive Safety Culture.

SIRIO is a Business Aviation Operator, offering his services worldwide from its main hub at Milan Linate Airport (LIML) and secondary bases in Treviso (LIPH), Bologna (LIPE), Ancona (LIPY), and Perugia (LIRZ). Since 2018, SIRIO has been a proud member of the Directional Aviation group, contributing to the expansion of its sister company, Flexjet, across Europe. SIRIO plays a crucial role in supporting Flexjet's operations by providing maintenance and CAMO services to Flexjet European fleet.

The heart of SIRIO is its fleet comprising 15 aircraft, including Bombardier Challenger 350, Global Express, and Global 5500, as well as Dassault Falcon 2000 Classic/LX/LXS and Falcon 7x, Gulfstream G550. Each aircraft is meticulously maintained to ensure the highest standards of Safety and performance.

SIRIO boasts several certifications that underscore its commitment to excellence and Safety. These include the Aircraft Operator Certificate (AOC) approved by both the European Union Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA), enabling the company to operate its fleet globally. Additionally, SIRIO holds the Continuing Airworthiness Management Organization (CAMO) certification, ensuring the airworthiness of its fleet, and the Approved Maintenance Organization (AMO) certification approved by EASA, the UK CAA, and the FAA, allowing SIRIO to conduct maintenance on its European, British an American aircrafts. Furthermore, as an Approved Training Organization (ATO), SIRIO provides training to its flight crews and also to external customers.

Notably, SIRIO is also an Approved Service Facility for Bombardier aircraft, a testament to its expertise and proficiency in aircraft maintenance.

Moreover, the company holds the prestigious IS-BAO Stage 3 certification, which recognizes the highest level of maturity in Safety Management Systems and overall management systems. This certification underscores SIRIO's unwavering commitment to upholding the highest Safety standards in the Business Aviation sector.

Through collaborative efforts with EUROCONTROL and SIRIO SPA, this research aims to conduct a comprehensive analysis of Safety Culture within the aviation industry. Leveraging the expertise and resources of the organizations listed above, we try to contribute to the continuous enhancement of Safety management practices and the promotion of a positive Safety Culture within the aviation domain.

1.2 PURPOSE AND OBJECTIVES OF THE THESIS

Safety Culture stands as a pivotal factor in the aviation industry, influencing the behaviours, attitudes, and decision-making processes that ultimately shape Safety outcomes. Understanding Safety Culture is not merely an academic pursuit; it is a critical imperative for aviation organizations seeking to enhance Safety performance and mitigate risks. This thesis endeavours to delve into the multifaceted nature of Safety Culture in aviation, aiming to demystify its complexities and illuminate the pathways towards its effective measurement in Aircraft Operators.

The purpose of this thesis is twofold: first, to demystify the concept of Safety Culture and its operationalization within the aviation context, and second, as the maiden objective, to explore the scientific methodology of the EUROCONTROL Safety Culture Questionnaire employed for measuring Safety Culture in an Aircraft Operator. By dissecting the underlying principles and Dimensions of Safety Culture, this research seeks to unveil its significance as a cornerstone of Safety management in aviation. Through rigorous examination and analysis, this thesis aims to provide a nuanced understanding of Safety Culture that transcends mere conceptualization, paving the way for practical applications in Safety management practices.

Aligned with this overarching purpose, the objectives of this thesis are delineated as follows:

Objective 1

To provide an overview of Safety Culture and its intrinsic relevance to the aviation industry.

By delving into the foundational principles of Safety Culture, this thesis aims to offer a

comprehensive understanding of Safety Culture, highlighting its pivotal role within the aviation sector and to explore the core principles of Safety Culture into which Safety Culture is divided for the purpose of this study.

Objective 2

To explore the Safety Culture Questionnaire methodology utilized for measuring Safety Culture in aviation organizations. Through a systematic examination of this measurement approach, this research seeks to identify best practices and challenges inherent in the measurement of Safety Culture, providing insights into the application of this measurement tools.

Objective 3

To conduct a case study analysis of a selected aircraft operator, illustrating the practical application of Safety Culture measurement tools in real-world settings. By leveraging a case study approach, this thesis aims to capture the complexities and nuances of Safety Culture within a specific organizational context, shedding light on the contextual factors that influence Safety Culture perceptions and behaviours.

Objective 4

To assess the effectiveness of the Safety Culture Questionnaire in identifying strengths, best practices and areas of improvement in organizations and find limitations, and recommendations for its application to aircraft operators. Through a thorough evaluation of the questionnaire's application, this study aims to provide insights into optimizing its use for assessing and enhancing Safety Culture within the Aviation industry.

Through the attainment of these objectives, this thesis aspires to contribute to the advancement of knowledge in the field of aviation Safety and serve as a catalyst for the development of effective strategies for cultivating a positive Safety Culture within aviation organizations.

1.3 HYPOTHESIS

As a consequence of what is written in the thesis objectives, the following hypothesis is formulated, which, together with the objectives listed above, will be analysed in this study and eventually validated or rejected:

Validation of EUROCONTROL Safety Culture Questionnaire for Aircraft Operators

The ultimate aim of this thesis, following the defined steps outlined earlier, is to validate the use of the EUROCONTROL Safety Culture Questionnaire for an Aircraft Operator. By successfully demonstrating its effectiveness and relevance in assessing Safety Culture within this context, the study seeks to broaden the application scope of this survey tool, which has been primarily utilized for Air Navigation Service Providers (ANSPs). This expansion of applicability would represent a significant advancement in the field of aviation Safety management, enabling Aircraft Operators to benefit from the insights and methodologies derived from the survey, thus contributing to the overarching goal of enhancing Safety culture and performance across the industry.

1.4 RESEARCH METHODOLOGY

This chapter outlines the methodologies employed in this study. Initially, we will delve into an analysis of the concept of Safety Culture, examining its definitions, Dimensions, and significance within the aviation industry. Following this, we will explore the EUROCONTROL Safety Culture Survey, detailing its development, structure, and application in assessing Safety Culture within Air Navigation Service Providers (ANSPs) across Europe.

Subsequently, we will transition to the application of the Safety Culture Survey to the case study of an Aircraft Operator and Maintenance Organization. This phase will involve administering the survey, collecting data, and analyzing the results to evaluate the Safety Culture within the selected organization. Through this process, we aim to assess the applicability and effectiveness of the survey tool in the context of Aircraft Operators, expanding its scope beyond ANSPs.

Finally, we will conclude the study by synthesizing the findings and drawing conclusions regarding the main hypothesis. This entails validating or refuting the hypothesis based on the insights gleaned from the analysis of Safety Culture within the Aircraft Operator. Additionally, we will discuss the implications of our findings for the broader aviation industry and offer recommendations for future research and applications of Safety Culture assessment tools.

2 FUNDAMENTAL CONCEPTS

2.1 DEFINITION OF SAFETY IN AVIATION

Aviation Safety, as defined by the International Civil Aviation Organization (ICAO), involves the proactive implementation of preventive measures and risk management strategies to ensure the protection of individuals and property engaged in aviation activities. It encompasses the systematic identification, evaluation, and mitigation of hazards and risks associated with air transportation, with the primary objective of preventing accidents and incidents.

In the expansive domain of aviation, Safety serves as the bedrock upon which the entirety of flight operations is constructed. At its essence lies a meticulously crafted framework of practices, regulations, technologies, and collaboration, all orchestrated to uphold the integrity and dependability of air travel.

According to the International Civil Aviation Organization (ICAO), the global authority on aviation Safety, Safety embodies a proactive approach aimed at minimizing risks and reinforcing protections for individuals and property involved in aviation activities. This definition encompasses a broad array of Safety measures, spanning from rigorous regulations to cutting-edge technologies, all intricately interwoven to foster a culture of prevention and resilience within the aviation sector.

At the heart of the pursuit of aviation Safety lies an unwavering dedication to accident prevention. This proactive stance necessitates a multifaceted strategy, commencing with a thorough identification and assessment of potential hazards. From mechanical malfunctions to environmental factors, every conceivable risk element undergoes meticulous scrutiny to gauge its potential impact on flight Safety.

However, mere identification of risks is insufficient. Aviation Safety mandates a systematic evaluation of these risks, considering their likelihood and severity to effectively prioritize

mitigation efforts. This strategic analysis empowers stakeholders, including airlines, regulatory bodies, and manufacturers, to allocate resources judiciously, focusing on addressing the most critical vulnerabilities.

Significantly, aviation Safety transcends the technical realm, encompassing the human factor through comprehensive training and educational initiatives. Pilots, engineers, air traffic controllers, and ground personnel undergo continuous instruction, equipping them with the knowledge and skills to navigate intricate scenarios with confidence and competence.

Furthermore, the robust framework of aviation Safety is reinforced by a network of regulatory agencies, such as the European Aviation Safety Agency (EASA), which meticulously formulate and enforce standards governing all facets of aviation operations. From aircraft design to maintenance protocols, these regulations serve as a bulwark against complacency, ensuring that Safety remains paramount in every aspect of aviation.

Simultaneously, the relentless march of technological advancement continues to redefine the landscape of aviation Safety. Cutting-edge systems for collision avoidance, real-time monitoring, and predictive maintenance provide stakeholders with unprecedented insights and capabilities, enabling proactive interventions to forestall potential risks before they escalate into crises.

Ultimately, aviation Safety is a collaborative endeavor, necessitating unwavering commitment and cooperation across a spectrum of stakeholders. From governmental bodies and regulatory agencies to airlines and passengers, each entity plays a pivotal role in upholding the sanctity of flight. By embracing the principles of prevention, resilience, and continual improvement, the aviation industry reaffirms its steadfast commitment to Safety, ensuring that the skies remain a sanctuary of security and reliability for generations to come.

2.2 DEFINITION OF SAFETY CULTURE

As per EUROCONTROL definition:

Safety Culture is the way safety is perceived, valued and prioritized in an organization. It reflects the real commitment to safety at all levels in the organization. It has also been described as "how an organization behaves when no one is watching".

Safety Culture is a complex and multifaceted concept that encompasses the shared beliefs, attitudes, values, and behaviors regarding Safety within an organization. It represents the collective perceptions, norms, and practices that influence how individuals and groups approach Safety-related activities and decisions in the workplace. A positive Safety Culture is characterized by a strong commitment to Safety, open communication channels, trust among employees, accountability for Safety-related actions, and a continuous focus on improving Safety practices. On the other hand, a negative Safety Culture may exhibit characteristics such as complacency, resistance to change, lack of communication, and a tendency to blame individuals rather than addressing systemic issues.

Safety Culture is deeply ingrained within an organization's cultural framework and is reflected in its policies, procedures, leadership practices, and organizational climate. It is often manifested through observable behaviors, rituals, symbols, and artifacts within the workplace. For example, a commitment to Safety may be demonstrated through regular Safety meetings, hazard reporting systems, Safety training programs, and visible leadership support for Safety initiatives.

Understanding Safety Culture is essential for organizations seeking to enhance Safety performance and mitigate risks effectively. A positive Safety Culture fosters a sense of collective responsibility for Safety among employees at all levels of the organization, leading to increased awareness of potential hazards, proactive identification and mitigation of risks, and a willingness to speak up

about Safety concerns. By promoting a positive Safety Culture, organizations can create an environment where Safety is valued, prioritized, and integrated into everyday work practices.

The decision to utilize the Safety Culture Survey was based on its established reliability and validity within the aviation context. By leveraging this standardized tool, we aimed to ensure consistency and comparability in our assessment of Safety Culture across different aviation organizations.

Additionally, the Safety Culture Survey offers a structured framework for data collection and analysis, facilitating the systematic evaluation of Safety Culture within the selected aircraft operator. Through the administration of the survey and subsequent analysis of the results, we sought to gain insights into the prevailing Safety Culture within the organization, identify areas of strength and improvement, and inform evidence-based recommendations for enhancing Safety performance.

2.3 THE ESSENTIAL ROLE OF SAFETY CULTURE IN AVIATION

In the intricate world of aviation, Safety Culture stands as a cornerstone of paramount importance. It embodies the collective attitudes, beliefs, practices, and values regarding Safety shared by all members of an organization. More than a mere adherence to rules and regulations, Safety Culture reflects a deep-rooted mindset where Safety is ingrained in every aspect of operations.

Human factors play a central role in aviation operations despite technological advancements. Errors and lapses in judgment contribute significantly to incidents and accidents. A robust Safety Culture addresses this by fostering open communication, teamwork, and accountability. It encourages individuals to report errors and near-misses without fear of retribution, facilitating the implementation of corrective measures to prevent recurrence and reduce accidents stemming from human error.

Aviation inherently involves numerous risks, from mechanical failures to environmental hazards. A strong Safety Culture promotes a proactive approach to risk management. It introduces vigilance in identifying potential hazards, assessing risks, and implementing effective mitigation strategies.

Through comprehensive risk assessments and Safety audits, organizations anticipate and mitigate potential threats before they escalate into Safety incidents or accidents.

While regulatory compliance is mandatory in aviation, a robust Safety Culture goes beyond meeting minimum standards. It reflects a genuine commitment to Safety excellence, with organizations often exceeding regulatory requirements. By continuously striving for improvement and innovation, aviation entities demonstrate their dedication to upholding the highest Safety standards.

Safety incidents not only jeopardize human lives and assets but also pose significant risks to an organization's reputation and credibility. A single Safety lapse can tarnish an organization's reputation built over years of diligent effort. A positive Safety Culture, characterized by visible commitment to Safety at all levels, enhances reputation and fosters trust among passengers, stakeholders, and the public.

Contrary to popular belief, Safety and operational efficiency are not conflicting objectives. A strong Safety Culture enhances operational efficiency by minimizing disruptions caused by Safety incidents. Organizations that prioritize Safety experience fewer delays, optimize resource allocation, and foster a culture of accountability and continuous improvement.

Safety Culture is not static; it requires ongoing cultivation and evolution. Organizations must continuously evaluate their Safety practices, learn from past incidents, and implement necessary improvements. A culture of continuous improvement fosters innovation, adaptability, and resilience, enabling organizations to stay ahead of emerging risks and regulatory requirements.

A strong Safety Culture prioritizes the well-being and engagement of employees. By providing comprehensive training, resources, and support systems, organizations empower their workforce to perform their duties safely and confidently. Engaged employees who feel valued and supported are more likely to actively contribute to maintaining a safe operational environment.

In conclusion, Safety Culture is fundamental to aviation Safety. It permeates every aspect of an organization's operations, shaping behaviours, and influencing decision-making. By fostering a positive Safety Culture, aviation entities can mitigate risks, enhance operational efficiency, safeguard their reputation, and ensure the Safety and well-being of all stakeholders involved in aviation operations.

2.4 DIMENSIONS OF SAFETY CULTURE

Safety Culture is a multifaceted concept that encompasses various interconnected Dimensions within an organization. Examining these Dimensions provides a deeper understanding of how Safety Culture influences Safety practices and performance. The Dimensions of Safety Culture explored in this work, through the Safety Culture Questionnaire, are explained here below:

1. **Managers' Commitment to Safety**: Managers' commitment to Safety sets the tone for the entire organization. This dimension assesses the extent to which managers prioritize Safety, allocate resources, and demonstrate visible leadership in promoting a Safety-oriented culture. Questions in this section gauge managers' support for Safety initiatives, their responsiveness to Safety concerns raised by frontline staff, and their involvement in Safety-related decision-making processes from the point of view of the staff.

2. **Collaboration and Involvement:** Effective collaboration and involvement of all stakeholders are vital for fostering a robust Safety Culture. This dimension evaluates the degree to which employees feels encouraged to participate in Safety-related activities, such as Safety committees, hazard reporting systems, and Safety improvement projects. Questions in this section assess the organization's efforts to foster teamwork, communication, and shared responsibility for Safety outcomes.

3. **Just Culture and Reporting**: A just culture encourages open and transparent reporting of Safety incidents and near misses, without fear of blame or punishment. This dimension examines the view of staff regarding the organization's approach to error management,

accountability, and the fairness of disciplinary actions following Safety-related incidents. Questions in this section explore employees' perceptions of the organization's response to Safety concerns and their confidence in the reporting process.

4. **Communication and Learning**: Effective communication channels and a culture of continuous learning are essential for identifying and addressing Safety issues proactively. This dimension assesses the clarity, timeliness, and effectiveness of Safety-related communication within the organization. Questions in this section focus on staff perception of the organization's mechanisms for sharing lessons learned from Safety events, disseminating Safety-related information, and promoting a culture of shared learning.

5. **Risk Handling**: Risk handling involves identifying, assessing, and mitigating Safety risks to prevent accidents and incidents. This dimension evaluates the organization's risk management processes, including hazard identification, risk assessment, and risk control measures. Questions in this section probe employees' awareness of Safety hazards, their involvement in risk assessment activities, and their perceptions of the organization's effectiveness in managing Safety risks.

6. **Colleague Commitment to Safety**: The commitment of colleagues to Safety is a crucial component of a positive Safety Culture. This dimension assesses employees' attitudes, behaviors, and actions related to Safety. Questions in this section gauge employees' adherence to Safety procedures, their willingness to intervene in unsafe situations, and their support for Safety initiatives and programs.

7. **Staff and Equipment**: Ensuring the competence of staff and the reliability of equipment is essential for maintaining Safety standards. This dimension examines the organization's efforts to recruit, train, and retain qualified personnel, as well as its investments in maintaining and upgrading Safety-critical equipment. Questions in this section focus on employees' perceptions of their own competence and the adequacy of equipment for performing Safety-critical tasks.

8. **Procedures and Training**: Clear and comprehensive procedures, along with effective training programs, are essential for ensuring that employees have the knowledge and skills necessary to perform their duty maintaining high Safety levels. This dimension evaluates the organization's procedures for managing Safety-critical tasks, as well as its training programs for employees. Questions in this section assess employees' opinion on company procedures, the adequacy of training received, and their confidence in their ability to perform Safety-critical tasks.

In conclusion, the Dimensions of Safety Culture provide a comprehensive framework for evaluating Safety Culture within aviation organizations. By addressing these Dimensions, organizations can foster a culture of Safety enhancing Safety performance and ensuring the continued Safety of all stakeholders.

2.5 APPROACHES TO MEASURING SAFETY CULTURE

Measuring Safety Culture is essential for aviation organizations to assess the effectiveness of their Safety management systems and identify areas for improvement. This chapter explores various approaches and methodologies used to measure Safety Culture within aviation, drawing on insights from academic research and industry best practices.

1. **Surveys and Questionnaires:**

Surveys and questionnaires are widely used tools for assessing Safety Culture within aviation organizations. These instruments typically consist of a series of questions designed to measure employees' perceptions, attitudes, and behaviors related to Safety. Surveys and questionnaires provide direct feedback from employees and managers giving valuable insights into the prevailing Safety Culture within an organization and help identify areas of strength and weakness.

2. Focus Groups and Interviews:

Focus groups and interviews are qualitative methods used to gather in-depth insights into Safety Culture within aviation organizations. These approaches involve facilitating group discussions or conducting one-on-one interviews with employees to explore their perceptions, experiences, and attitudes towards Safety. Focus groups and interviews allow for a more nuanced understanding of Safety Culture dynamics, including underlying beliefs, values, and cultural norms that may not be captured by quantitative measures alone.

3. Observations and Behavioral Assessments:

Observations and behavioral assessments involve directly observing employees' behaviors and actions in the workplace to assess Safety Culture. This approach focuses on identifying observable indicators of Safety Culture, such as compliance with Safety procedures, adherence to Safety protocols, and Safety-related interactions among employees Observations and behavioral assessments provide real-time insights into Safety Culture and can help identify areas where Safety practices may be inconsistent or at risk.

4. Safety Performance Indicators:

Safety performance indicators are quantitative metrics used to track and monitor Safety Culture within aviation organizations. These indicators may include measures such as Safety incident rates, near-miss reports, Safety-related complaints, and Safety-related training completion rates. By analyzing Safety performance data over time, organizations can assess trends, identify patterns, and measure the effectiveness of Safety Culture interventions.

In this study, the choice was to only employ the Survey to explore the intricacies of Safety Culture within aviation organizations and validate the means of data gathering and analysis. These methods provide a thorough comprehension of Safety Culture dynamics and an assessment of the Safety Culture sentiment through the organization.

3 METHODOLOGY

3.1 THE EUROCONTROL SAFETY CULTURE SURVEY

The Safety Culture Questionnaire (SCQ) is a comprehensive tool designed by EUROCONTROL to assess Safety Culture within aviation organizations. Having been applied to numerous Air Navigation Service Providers (ANSPs) over several years, the SCQ has established itself as a reliable instrument for evaluating Safety Culture dynamics. The questionnaire consists of a series of statements (defined as Factors) intended for respondents to assess, choosing from five response options on a five-point scale. The questionnaire is structured into four distinct sections:

- **Section A** (3 Items): **Demographics** - This section gathers basic demographic information such as department, primary role, and location of the respondents.

- **Section B** (29 Items): **General** - Designed for both management and operational staff, this section covers a broad spectrum of Safety Culture Dimensions relevant to all personnel within the organization.

- **Section C** (20 Items): **Operational** - Tailored specifically for operational staff members, including controllers, Meteorological (Meteo) staff, Aeronautical Information Services (AIS) staff, Air Traffic Services (ATS) assistants, operational supervisors, and maintenance technicians/engineers/supervisors (e.g., Air Traffic Safety Electronics Personnel - ATSEP). For the purpose of this work, adaptations have been made to the Demographics of the Survey, making it available to the aircraft operator and maintenance organization operational personnel like Pilots, Maintenance Technicians and Engineers.

- **Section D** (1 Item): **Feedback** - This section provides respondents with an opportunity to offer open-ended comments on the questionnaire itself and raise any additional Safety-related issues they feel were not adequately addressed.

These parts of the Safety Culture Questionnaire (SCQ) were carefully put together after a lot of research to cover the most important areas that need checking in the organization. The aim of the questionnaire is to get answers that show how people in the organization see and care about Safety right now. By getting responses from people in different jobs and departments, the SCQ helps us get a good idea of how Safety is seen throughout the organization.

The user must fill out the first part (Section A) identifying his or her role in the organization so as to distinguish whether it is necessary to fill out only Section B or also Section C.

Section B and Section C are composed of 49 Factors, each Factor is a statement that the user must rate from 1. "Strongly Disagree" to 5. "Strongly Agree".

It is not mandatory for the user to answer every question, the option is left to leave blank Factors that the user does not feel are applicable to his or her situation or that, for whatever reason, the user prefers not to answer.

The 49 Factors are mapped out and organized into groups aligned with the Safety Culture Dimensions listed in Chapter 2.4 of this work.

This methodical approach allows them to gain a comprehensive insight into their Safety practices, ensuring that each Factor is placed within its appropriate dimension. By doing so, they aim to foster a culture of Safety excellence, identifying areas of strength and areas for improvement. The aim of the SCQ is to thoroughly explore the perspectives of individuals in various positions regarding Safety. This enables us to gain a comprehensive understanding of Safety from diverse viewpoints, ensuring that no crucial aspects are overlooked. By analyzing the responses of all personnel within the organization, we can paint a complete picture of how Safety is perceived. This insight empowers leaders to identify areas of success and areas in need of improvement, guiding us in determining the necessary steps to enhance Safety levels and promote a culture of Safety across the organization.

3.2 ADAPTATION FOR AN AIRCRAFT OPERATOR

The SCQ was developed by EUROCONTROL specifically for application to Air Navigation Service Providers (ANSPs). For the purpose of this study, which focuses on an Aircraft Operator, some modifications were necessary to adapt it to the specific situation.

The modifications were introduced only in Section A, Demographics, while Sections B and C remained unchanged for two reasons. Firstly, any changes could have distorted the meaning of the Factors, which have been carefully developed, tested, and validated on multiple occasions. Secondly, a review was conducted of all Factors, which were found to be fully applicable even in the case of an Aircraft Operator.

To develop Section A, a study of the company's organizational structure was conducted, mapping it to identify the main groups. For Section A01, the Departments of the company were identified, with necessary consolidations made to ensure a reasonable number of groups and to avoid dispersion.

It's important to note that creating groups composed of fewer than 10 people is discouraged, as responses from such groups cannot be filtered to see the results of that specific group; however, responses from members of this group are included in the overall statistics. This choice was made by the developers to ensure participant anonymity.

In this specific case, only one group was created knowing in advance that this threshold would not be exceeded, namely the "Management System" group. This group was named according to the expanded definition of EASA's Management System, which includes Safety, Compliance Monitoring, and in our case, Security functions. This was deemed acceptable as not having specific statistics for this group was not considered problematic for the study, given that these individuals are reasonably considered the most involved in Safety processes and therefore have greater awareness.

SECTION A – Demographics

The information supplied in this section provides general demographic details. Individual data will remain completely confidential and it will not be possible to identify you personally. Only group summary data will be used in analysis.

A01 In which department do you work?
*

◯ Administrative Dept

◯ Management System Staff (e.g. Safety, Compliance, Ground, Security)

◯ Flight Operations / Training

◯ CAMO / AMO

◯ Other

Figure 1 - Section A01 Department

In Section A02, Primary Roles were defined. This was firstly because within a department, there are individuals with different roles, for example, within the Flight Operations department, there are Pilots, Flight Attendants, and Ground Staff (Flight Dispatchers). Secondly, because there are individuals who hold dual roles, such as Pilots who also hold Managerial roles: in this case, the wording " >50% of your time" is included to provide clear guidance to the participant.

A02 What do you consider to be your <u>primary</u> role (>50% of your time)?
*

◯ Administrative Staff (Accounting/Finance Staff, General Services, IT)

◯ Pilot / Flight Attendant

◯ Ground Staff (Safety/Compliance, Training/Ground, FCO, CAMO Officer, AMO Officer, Logistics Officer)

◯ Maintenance Technician

◯ Other

Figure 2 - Section A02 Role

Here below is the table depicting the intersection of A01 and A02 to identify the groups. The Red boxes indicates the groups for which the filtered results would not be available, the Green ones the ones for which this granular view and analysis will be possible:

A01 In which Department /Unit do you work?	A02 What do you consider to be your primary role?					
	A. Administrative Staff (Accounting/Finance Staff, General Services, IT)	B. Pilot - Flight Attendant	C. Ground Staff (Safety/Compliance, Training/Ground, FCO, CAMO Officer, AMO Officer, Logistics Officer)	D. Maintenance Technician		
1. Administrative Dept	15				15	Section B Only
2. Management System Staff (e.g. Safety, Compliance, Ground, Security)			6		6	Section B & C
3. Flight Operations - Training		44	6		50	
4. CAMO - AMO			19	27	46	
	15	44	31	27	117	

Figure 3 - Demographics Overview

Section A03 pertained to the geographical distribution of personnel. Considering that SIRIO currently has its Main Base at Milan Linate (LIML) and Operational Bases/Line Stations at the airports of Bologna (LIPE), Treviso (LIPH), Ancona (LIPY), and Perugia (LIPZ), it was deemed insightful to include the option between Main Base and Secondary Base to assess whether the perception of the company's Safety level varies between those stationed at the headquarters and those deployed at secondary bases.

A03 Where do you normally work in your primary role? *

○ Main Base (Linate)

○ Secondary Base (Ancona, Bologna, Perugia, Treviso)

Figure 4 - Section A03 Main or Secondary Base

This decision stemmed from the recognition of potential differences in work environments and operational contexts between employees based at the main headquarters and those stationed at secondary bases. By offering this distinction in the questionnaire, the study aimed to capture any variations in Safety perceptions that may arise due to geographic location or operational setting. This information is valuable for identifying specific areas where Safety Culture may need to be reinforced or tailored to meet the unique needs of employees across different locations. Additionally, it allows for targeted interventions and initiatives to address any disparities and ensure a consistent Safety Culture throughout the organization, regardless of geographic location.

In addition to modifying the demographic section, the descriptive introduction of the survey was also revised to tailor it to an Aircraft Operator. Given the unique operational context and specific requirements of aviation organizations, adjustments were made to ensure the relevance and applicability of the survey content.

The survey introduction text contains the following information for participants:

a)   Individual responses are anonymous and will be kept confidential.

b)   Results are reported at group level – individuals cannot be identified.

c)   We want to understand opinions about how the organization currently works, not about how it should work.

d)   If you find a question that you do not understand or does not apply to you – do not answer it.

e)   Time to complete all sections of the survey is approximately 10 minutes.

Furthermore, to enhance accessibility and comprehension for all participants (and hopefully the Participation Rate, particularly considering the Italian context of the company, the author of this study undertook the task of translating the entire survey from English to Italian while preserving the meaning of the Factors. This translation effort aimed to accommodate participants who may be more comfortable or proficient in Italian, thereby promoting inclusivity and ensuring that all personnel could effectively engage with the survey materials.

3.3 CONFIDENTIALITY

It is crucial to emphasize that the questionnaire ensures full anonymity of the participants' responses. No personal information is recorded beyond the data voluntarily provided in Section A, which aims to collect basic demographic information. This approach guarantees maximum confidentiality and encourages open and sincere participation from employees, without fear of potential repercussions or consequences. Furthermore, the questionnaire results are aggregated and presented exclusively at the group level, without individually identifying participants. This presentation mode aims to protect the privacy of individuals and create a trusting environment where employees feel free to express their opinions and concerns regarding the company's Safety Culture.

This anonymity is safeguarded through stringent data protection measures, including encryption of responses and restricted access to survey results. Additionally, participants are assured that their responses will not be traced back to them individually, further reinforcing the confidentiality of the process. By upholding these confidentiality standards, the organization demonstrates its commitment to respecting the privacy and confidentiality of its employees while fostering an environment conducive to open communication and feedback.

In fact, confidentiality during the questionnaire process is crucial for several reasons. Firstly, confidentiality encourages participants to provide honest and candid responses, without fear of judgment or negative consequences. This fosters the collection of accurate and representative data, which in turn allows for a more precise assessment of the Safety Culture within the organization. Additionally, ensuring anonymity protects the privacy of individual employees, fostering an atmosphere of trust and mutual respect in the workplace. Maintaining the confidentiality of responses also promotes a climate of openness and transparency, encouraging the free expression of opinions and concerns without fear of retaliation or discrimination. Finally, data confidentiality is essential to ensure compliance with privacy regulations and protect the rights of the participants.

3.4 RUNNING THE QUESTIONNAIRE

After completing the setup phase of Section A, which involved gathering basic demographic information from employees, it was necessary to engage in a promotional campaign to inform all employees about the upcoming Safety Culture survey and to encourage their participation. This promotional phase holds significant importance for both the company and the survey administrators, as well as for potential participants.

For the company and survey administrators, effective communication during this phase serves several crucial purposes. Firstly, it provides an opportunity to convey the reasons for conducting the study and the importance of obtaining input from all employees. By explaining the objectives and scope of the survey, as well as the anticipated outcomes, the company can generate interest and buy-in from participants. Additionally, clear communication about the timing and procedures involved in completing the survey helps ensure that employees understand what is expected of them and how they can contribute to the process.

Moreover, employing an effective communication strategy can pique the interest of potential participants and motivate them to take part in the survey. By highlighting the significance of Safety Culture within the organization and emphasizing the role that employee feedback plays in shaping Safety practices, the company can encourage active participation from its workforce.

On the other hand, for potential participants, particularly when expressing opinions on a complex and sensitive topic like Safety within their company, assurance of anonymity is crucial. Employees want reassurance that their responses will not be handled in a manner suggestive of a blame culture, and that they will not face any repercussions for how they fill out the survey. Hence, the importance of confidentiality, as outlined in Chapter 3.3 of this paper, cannot be overstated. Clear communication about the confidentiality measures in place helps build trust and confidence among participants, encouraging them to provide honest and candid feedback.

Additionally, participants expect their efforts in completing the questionnaire to be acknowledged,

with their responses read, analyzed, and discussed by the company's decision-makers. This fosters a sense of trust between the participant and the company conducting the survey, making employees more likely to engage in future Safety initiatives and initiatives aimed at improving Safety Culture within the organization.

Since participation in the survey was completely anonymous and tracking individual responses was not feasible, targeted efforts to promote and raise awareness among specific individuals were impractical. Instead, promotional activities were directed towards entire departments, relying on the spontaneous engagement of individuals. This approach proved to be pivotal in gathering a substantial number of participants, thereby ensuring the study's success. Without the ability to tailor communications to individual employees, the emphasis was placed on fostering a culture of collective involvement and encouraging all staff members to contribute their perspectives on Safety. This inclusive approach not only helped in achieving a diverse representation of viewpoints but also instilled a sense of ownership and accountability among employees for the outcomes of the survey.

The communication strategy adopted to publicize the survey primarily focused on three fronts:

1. Publication of company-wide communications through Safety Promotion channels, such as Safety Advisories (monthly bulletins containing relevant Safety information) and specially developed posters. These communications served to raise awareness about the upcoming survey and emphasize its importance in shaping Safety practices within the organization.

2. Verbal communication during company management meetings, such as the Safety Review Board, to involve all managers in the initiative and encourage them to engage all employees in their respective areas. This approach proved effective as employees felt encouraged on multiple fronts to express their opinions, viewing positively the involvement of their respective managers, who, as area managers, bear some responsibility for the work carried out.

3. Verbal communication conducted in a personal and informal manner with all employees to

explain the reasons behind the survey and the expected outcomes. This direct approach helped create a sense of transparency and openness, encouraging employees to actively participate and contribute their perspectives on Safety Culture within the organization.

The questionnaire launch was meticulously planned in advance to allow for ample time to conduct all preparatory activities and promote the initiative effectively as described above. The planning phase involved approximately one month of continuous exchange of information with EUROCONTROL experts responsible for the European Safety Culture Programme implementation. A detailed timeline was developed and followed, outlining key milestones and deadlines for each stage of the process. This timeline, included in Annex I, served as a guide to ensure that all necessary tasks were completed on schedule.

The questionnaire was made accessible to all employees on the morning of 12/02/2024 through an email, prepared in advance and also tailored for Sirio, sent by EUROCONTROL European Safety Culture Programme. The initial plan was to keep it open for exactly 3 weeks, with the option to extend for an additional week if necessary.

The survey was made accessible to employees via the link provided in the aforementioned email, as well as through a specially designed poster posted on the company's management software, allowing access to the questionnaire with a single click. Additionally, posters with QR codes were placed in company premises such as offices, dining areas, and hangars to ensure easy access.

The survey was in digital format and accessible from both PCs and mobile devices.

The participation rate was monitored approximately every three days for the initially planned three weeks, following which it was decided to involve the company's Accountable Manager to send a reminder to all employees, asking those who had not yet done so to complete the survey. Overall, the survey lasted for 4 full weeks ending on 11 March.

3.5 DATA GATHERING AND ANALYSIS

The data concerning the responses were collected and stored on EUROCONTROL servers, while no personal data of the participants was collected in any way to maintain confidentiality. During the survey availability period, the only accessible data were related to the participation rate to monitor the questionnaire's success.

Upon completion of the questionnaire, the EUROCONTROL team dedicated efforts to validate the data, filtering out any questionnaires that were repetitively and evidently erroneous, ensuring that the data presented in the final report remained as accurate and reflective of reality as possible.

The subsequent phase involved importing the response data into the visualization and analysis tool to view the report results and analyze the responses. The specific tool utilized for this purpose is the Microsoft PowerBI suite, designed to import all response data and arrange it for simple and comprehensive visualization.

PowerBI was crafted to conduct data analysis and present information in a statistically significant and easily interpretable manner. This aspect is crucial as clear and organized reports immediately convey essential insights, enabling both report readers to interpret findings without prior in-depth study of the applied methodology and those intending to explain the results to management or staff during dedicated meetings and workshops to do so clearly and unequivocally.

The analysis conducted by PowerBI involves assigning specific Factor to their respective Dimensions listed in Chapter 2.4. Thus, each Dimension is assigned a specific value derived from the participants' response averages. By examining the scores of individual Dimensions (ranging from 1. VERY NEGATIVE to 5. VERY POSITIVE), an overall overview of the health of the Safety Culture within the company across the 8 specific themes listed in the Dimensions can be obtained swiftly. This facilitates the quick identification of areas needing improvement and those performing well, which require further cultivation.

For a more detailed examination, the PowerBI report enables visualization of scores obtained from

individual questions. This allows for a more precise analysis to assess which specific Factors positively contribute to the Dimensions or simply to the company's Safety Culture.

The extensive analysis conducted through the PowerBI suite facilitated a thorough examination of the collected data, employing both quantitative and qualitative methodologies to glean insights into the Safety Culture dynamics within the organization.

Quantitative Analysis: In the territory of Quantitative Analysis, the focus was on extracting objective numerical data to measure the Safety Culture's performance metrics within the company. This involved statistical computations and calculations aimed at quantifying various aspects of Safety Culture, such as compliance levels, reporting frequencies, and adherence to Safety protocols. By relying on quantitative data, the analysis provided a clear and empirical understanding of the organization's Safety Culture landscape, devoid of subjective biases or interpretations.

Qualitative Analysis: it gives the possibility to delve deeper into the aspects of Safety Culture, leveraging personal experiences, contextual knowledge, and interpretative frameworks to extract meaningful insights from the data. This approach allowed analysts to discern underlying patterns, trends, and relationships that might not be readily apparent through quantitative metrics alone. Through qualitative analysis, researchers could uncover the underlying attitudes, perceptions, and behavioral dynamics that shape the organization's Safety Culture. This qualitative exploration enabled the formulation of hypotheses, the identification of root causes, and the development of targeted interventions to address underlying issues and foster a positive Safety Culture.

By combining both quantitative and qualitative methodologies, the analysis provided a comprehensive understanding of the Safety Culture landscape within the organization, equipping Managers and Safey Professionals with actionable insights to drive meaningful improvements in Safety Performance and Company Management strategies.

4 RESULTS

In this Chapter, we leverage a case study involving an Aircraft Operator and Maintenance Organization, examining it through the framework provided by EUROCONTROL's Safety Culture Survey tool. Widely utilized and validated within Air Traffic Management (ATM) organizations across Europe, this tool offers insights into Safety Culture dynamics.

It's important to clarify that while we draw upon the specific case study, we won't provide a comprehensive overview of the Safety performance of Sirio SPA or any other individual organization involved. Instead, our focus lies on evaluating the adaptability and effectiveness of the Safety Culture Survey beyond its traditional application in Air Navigation Service Providers (ANSPs). Rather than presenting detailed results from the specific Aircraft Operator, the emphasis is on the broader applicability of the survey tool for assessing Safety Culture within various aviation sectors, including aircraft operators.

By directing our attention towards the tool's applicability, we aim to contribute to the understanding of how Safety Culture surveys can be utilized to enhance Safety management practices across the aviation industry. This approach allows us to explore the potential benefits of extending the use of the survey tool, ultimately promoting safer and more resilient aviation Organizations.

4.1 RESULTS OF SIRIO-EUROCONTROL SAFETY CULTURE QUESTIONNAIRE

As mentioned in the introduction to this chapter, although we will not delve into detailed results of individual survey Factors and specific groups, it is crucial to include at least general data to draw conclusions and compare the particular application conducted for this study with previous studies and existing literature.

4.1.1 Result 1 – Participation Rate

Even before examining the actual results, it is important to look at the Participation data. This information is considered crucial because, while not directly linked to a specific Factor and therefore to a Dimension, it serves as an initial indirect indicator of employee engagement and trust in the Safety Management System (SMS) and the initiatives proposed. A low level of participation is indicative of a lack of confidence in the organization and the SMS by the employee. Furthermore, it limits the ability to fully utilize the analysis possibilities of the results, firstly because it represents a poorly representative sample of all employees, and secondly because, as already explained in this paper, if participants belonging to a specific group are <10, the responses' results cannot be filtered for that specific group, thus limiting analysis opportunities.

In the specific case of the survey conducted for this study, the Participation Rate was 71.8%. Below, the participation level for specific Departments is shown:

SURVEY PARTICIPATION

Organisation	Contacts	Participants	Response Rate
SIRIO	**117**	**84**	**71.8%**
Administrative Dept	15	9	60.0%
CAMO / AMO	46	31	67.4%
Flight Operations / Training	50	35	70.0%
Management System Staff (e.g. Safety, Compliance, Ground, Security)	6	7	116.7%
Other	0	2	

Figure 5 - Overview of Participation Rates

It's also important to consider the distribution of responses in relation to what was anticipated when the demographic part was decided. It's normal to find slightly discrepant data from what was projected, as some individuals may identify differently than anticipated during the design phase or may make errors in selection. Part of the data validation process involves verifying adherence to the expected demographic data and correcting any errors. It's worth noting that, since the "Other"

option is available, it may be chosen by those who don't identify with the proposed roles, creating misalignment with the initial projections.

Here below is the initial demographic design compared with the actual participation:

A01 In which Department /Unit do you work?	A02 What do you consider to be your primary role?					TOTAL	Participation Rate
	A. Administrative Staff (Accounting/Finance Staff, General Services, IT)	B. Pilot - Flight Attendant	C. Ground Staff (Safety/Compliance, Training/Ground, FCO, CAMO Officer, AMO Officer, Logistics Officer)	D. Maintenance Technician	E. Other		
1. Administrative Dept	15					15	
Responses	9					9	60,0%
2. Management System Staff (e.g. Safety, Compliance, Ground, Security)			6			6	
Responses			7			7	116,7%
3. Flight Operations - Training		44	6			50	
Responses		30	5			35	70,0%
4. CAMO - AMO			19	27		46	
Responses	1		12	15	3	31	67,4%
5. Other						0	
Responses	1				1	2	-
TOTAL EXPECTED	15	44	31	27	0	117	
TOTAL Responses	11	30	24	15	4	84	71,8%
Participation Rate	73,3%	68,2%	77,4%	55,6%			

Section B Only

Section B & C

Figure 6 - Details of Participation Rates

Comparing the questionnaire responses with the anticipated demographic breakdown, small discrepancies are observed. However, these discrepancies do not compromise the validity of the questionnaire in any way and allow for the unrestricted utilization of the analytical capabilities provided by the tool. The findings of this analysis confirm the accuracy of the demographic section's development and contribute to the hypothesis of the applicability of the survey to an AO.

4.1.2 Result 2 – Percentage of Responses to Questions

Now let's analyze the percentage of responses to the specific Items of the questionnaire. As mentioned earlier, to conclude and submit the questionnaire, it is not mandatory for participants to answer all questions. They have the option to skip those items they do not understand or do not consider applicable to their position.

Assessing this data is crucial to determine whether the Factors proposed in this questionnaire, not originally designed for Aircraft Operators but for ANSPs, are indeed applicable outside of the context for which it was constructed. A low percentage of responses to the questions suggests that many of the Factors were deemed unclear or not applicable by the participants, indicating a lack of suitability of the tool for its intended purpose. Conversely, a high percentage of responses to the questions indicates that almost all questions were deemed clear and applicable by the participants, confirming the effectiveness of EUROCONTROL's Safety Culture Questionnaire tool even for aircraft operators.

In this specific case, the response rate to the questions was remarkably high, reaching **89.93%.**
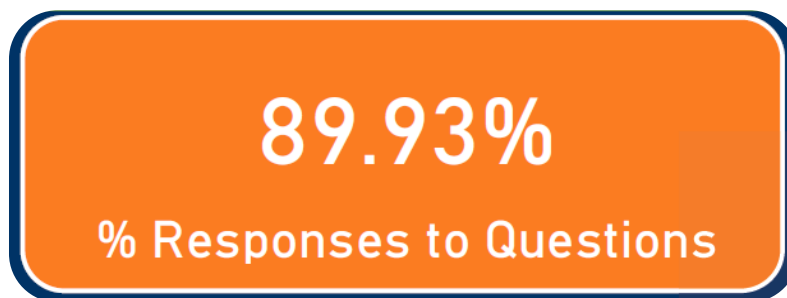
Figure 7 - Percentage of Responses to Questions

This is an exceptionally high result considering that the survey was administered to all departments, including Administration, which is undoubtedly the least involved in Safety processes.

4.1.3   Result 3 – Dimensions

When investigating into the analysis of the Dimensions, it becomes apparent that they serve as milestone elements in this study, offering precious insights into the Safety Culture of the organization under examination. These Dimensions serve as critical indicators, providing a comprehensive understanding of various components of Safety Culture within the company.

By examining the scores attributed to each Dimension, a clear and immediate comprehension of the sentiment regarding Safety Culture within the company emerges. This assessment goes beyond surface-level observations, offering a nuanced understanding of the underlying principles and values that shape the organization's approach to Safety.

The Dimensions serve as pillars of Safety Culture, representing key aspects that contribute to the overall Safety climate within the company.

It's noteworthy that the structure of the questionnaire, with its embedded Dimensions, ensures that participants respond to a diverse range of Safety-related questions without being aware of the specific categories being assessed. This blindness to the Dimensions eliminates potential bias, allowing participants to provide candid and genuine responses.

The availability of scores for each Dimension enables managers to validate or challenge their initial hypotheses regarding the organization's Safety Culture. Moreover, it facilitates the formulation of new hypotheses based on the observed results, guiding the development of targeted interventions and corrective actions to address any identified gaps or areas for improvement.

Incorporating a visual representation of the Dimension scores through a Spider Graph enhances the accessibility and interpretability of the findings. This graphical depiction offers stakeholders a quick and intuitive overview of the Safety Culture landscape within the organization, empowering them to identify patterns and trends, and areas of improvement with ease:
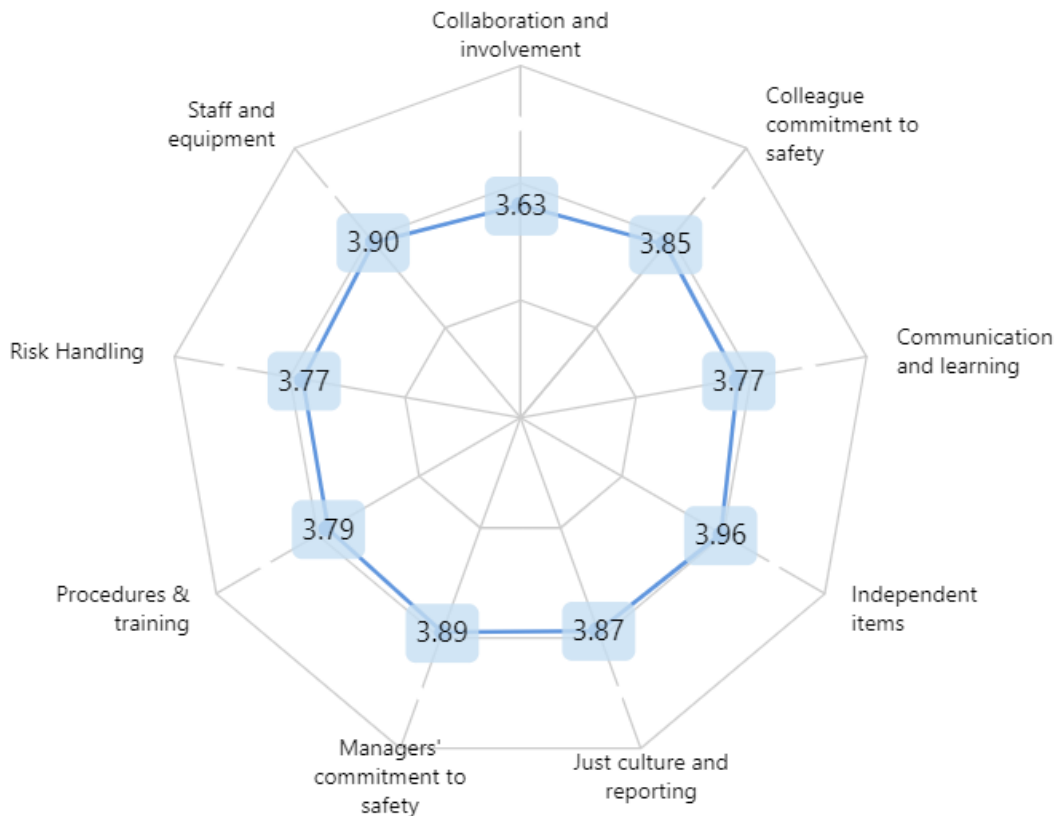
Figure 8 - Results of SIRIO Safety Culture Questionnaire Dimensions

This visualization is available for the overall results aggregated from all participants to provide a comprehensive overview of the company's Safety Culture. However, the filters available in PowerBI can be utilized to generate the same graph but specific to a particular department or role. This functionality allows for the customization of the analysis, enabling stakeholders to examine the Safety Culture Dimensions within individual departments or roles.

By applying filters based on Department or Role, precise statistics can be obtained, offering insights into the strengths and weaknesses of specific organizational units. This granular approach facilitates targeted interventions and allows for tailored strategies to enhance Safety Culture within

each department or among specific groups of employees.

Utilizing PowerBI filters not only enhances the depth of analysis but also enables stakeholders to identify department-specific trends, challenges, and areas for improvement. It empowers managers to develop focused action plans that address the unique needs and circumstances of each organizational unit, ultimately fostering a culture of Safety excellence across the entire company.

The ability to group data in this manner is immensely valuable, as it facilitates benchmarking both with other companies or industry standards and also within the same organization over time. Benchmarking allows companies to compare their Safety Culture performance against industry standards and best practices, identifying areas of excellence and areas needing improvement. Moreover, benchmarking against previous survey results within the same organization provides insights into the effectiveness of Safety initiatives and interventions implemented between surveys.

By conducting the Safety Culture survey at different intervals, organizations can track progress, observe trends, and measure the impact of Safety-related initiatives and interventions. This longitudinal approach enables companies to evaluate the effectiveness of their Safety programs, policies, and training initiatives over time.

Furthermore, comparing results across different departments, roles, or organizational units within the same company can highlight variations in Safety Culture perception and performance.

Identifying disparities allows organizations to target interventions where they are most needed and tailor strategies to address specific challenges faced by different groups or departments.

Overall, the ability to aggregate and analyze survey data using tools like PowerBI not only facilitates benchmarking against industry standards but also enables internal benchmarking, providing valuable insights for continuous improvement in Safety Culture within the organization. This iterative process of assessment, intervention, and re-assessment forms the foundation for fostering a robust and sustainable Safety Culture.

4.2 COMPARATIVE ANALYSIS WITH EXISTING LITERATURE

In the pursuit of understanding and contextualizing the findings of this paper, it is deemed highly beneficial to compare the results of the questionnaire with those reported in previous literature. Such a comparative analysis not only provides insights into the current state of Safety Culture within the studied Aircraft Operator but also allows for a broader perspective by comparing these findings with those from existing studies.

For the purpose of this paper, we have chosen to compare our results with those presented in the paper titled "Safety sans Frontieres: An International Safety Culture Model."

Specifically, we focus on comparing the overall results of Safety Culture Surveys conducted over the years in Air Navigation Service Providers (ANSPs) and cited in the paper below with the results obtained from the survey conducted in this study.

It was necessary to draw parallels and make the Dimensions of the questionnaire used in this study match those used at the time of the cited study (2015) to make them comparable. Therefore, an adaptation of the Dimensions was conducted.

The decision to leverage the insights from "Safety sans Frontieres" stems from its comprehensive exploration of Safety Culture across 17 ANSPs all over Europe, offering a robust framework for comparing results with the current study. By aligning our study with this established model, we aim to draw parallels, identify discrepancies, and glean valuable insights into the nuances of Safety Culture between ANSPs and the Aircraft Operator.

Comparing the results of Safety Culture Surveys conducted in ANSPs with our study's findings evolves in different steps:

1) **Identification of Commonalities and Differences**: From the analysis of the paper mentioned above, it is evident that there are similarities both in the Factors included in the survey and in how they are divided into different Dimensions. Additionally, some of the Dimensions used in the version of the Safety Culture Questionnaire in use at the time of the

referenced paper are very similar to those in the current version of the questionnaire. Therefore, we decided to move to phase 2 of this process by pairing the previously used Dimensions with those of the new questionnaire. The aim of this phase is to assess whether it was reasonable to compare them and to establish any correspondences or discrepancies.

2) **Adaptation of Dimensions**: An adaptation of the Dimensions was conducted to ensure comparability between the questionnaire used in this study and that used in the cited study (2015). This process involved aligning and modifying the Dimensions to match the framework utilized in "Safety sans Frontieres." as follows:

	Dimensions from Safety Sans Frontières	Dimensions of the current SCQ
1	Management Commitment to Safety	Managers' commitment to Safety
2	Collaborating for Safety	Collaboration and Involvement
3	Incident Reporting	Just Culture and Reporting
4	Communication	Communication and Learning
5	Colleague Commitment to Safety	Colleague commitment to Safety
6	Safety Support	NIL

Figure 9 - Matching of Dimensions

This alignment allowed for matching 5 out of the 6 previous Dimensions with their equivalents used in the new questionnaire. Despite being only a partial correspondence, it was deemed significant to proceed with this study and compare the results.

Since SIRIO is an Italian company, it was deemed significant to compare the results with those of "Safety Sans Frontières" concerning Southern Europe to remain consistent with the cultural aspects that can influence Safety Culture. Additionally, the previous paper makes a distinction between responses from "Operational" personnel and "Managers". Considering that in SIRIO many of the Managers also have roles as Pilots or Maintenance Technicians, and given that the individuals identifying themselves only as Managers were insufficient in number to provide statistical significance for that group, it was decided to refer to the values of the "Operational" personnel for comparison purposes.

3) **Evaluation of Progress and Trends**:

Before comparing the Dimensions, which represent the various facets in which Safety Culture can be identified, it is useful to compare the average Response Rate indicated in "Safety sans Frontières" with that of the survey conducted in SIRIO for this study. This comparison allows for an evaluation of the aircraft operator's effectiveness and response compared to the ANSPs.

	Safety Sans Frontières Tot.	SIRIO SCQ	% variation
Response Rate	61%	72%	18,03%

Figure 10 - Comparison of Participation Rates

This data is unexpected because it indicates that in the aircraft operator (for which this survey is in the phase of study and validation), there was a response rate higher by 18% compared to the average of the ANSPs. However, it is important to note that if such a high proportion of individuals from the aircraft operator responded to these questions, it is likely that they were deemed adequate. This serves as confirmation that this tool may be applicable even outside of the ANSPs.

Moving then to the Analysis of Dimensions, below is the comparison, with reference to the Adaptation of Dimensions operated in the 2nd step:

Dimensions	A. Safety Sans Frontières	B. SIRIO SCQ	A vs B (% variation)
1. Managers' commitment to Safety	2,5	3,89	55,60%
2. Collaboration and Involvement	2,8	3,63	29,64%
3. Just Culture and Reporting	2,26	3,87	71,24%
4. Communication and Learning	2,42	3,77	55,79%
5. Colleague Commitment to Safety	3,87	3,85	-0,52%

Figure 11 - Comparison of Dimensions' Results [South Europe]

There is a significant difference between the findings of the two studies, and considering the substantial temporal differences, the differences in the type of company, and the proposed adaptation of the Dimensions, it is not possible to draw scientifically relevant conclusions about the utility of comparing these results.

For completeness, it is deemed necessary to exclude the geographical component and compare the results with the entirety of responses from the 17 ANSPs across Europe. The assumptions made regarding the choice of department remain valid, so the responses from the "Operational" part are also evaluated in this case.

Below is the comparison:

Dimensions	C. Safety Sans Frontières Tot.	B. SIRIO SCQ	C vs B (% variation)
1. Managers' commitment to Safety	3,48	3,89	11,78%
2. Collaboration and Involvement	3,37	3,63	7,72%
3. Just Culture and Reporting	3,14	3,87	23,25%
4. Communication and Learning	3,22	3,77	17,08%
5. Colleague Commitment to Safety	3,99	3,85	-3,51%

Figure 12 - Comparison of Dimensions' Results [Total]

This observation indicates that despite the differences in organizational structure, operational contexts, and cultural factors between SIRIO and the ANSPs, there are commonalities in their Safety Culture that make comparisons feasible. These similarities could stem from overarching industry standards, regulatory frameworks, or shared Safety management practices. Therefore, while direct comparisons between individual organizations may not always be appropriate or informative, benchmarking against aggregated industry data such as the ANSPs' results could provide valuable insights into broader trends and benchmarks within the aviation sector.

4)   **Validation of Methodology**: These findings suggest that while direct correlations and comparisons between organizations of different types may not have been demonstrated, the study cited above reveals certain similarities. These similarities serve as indications supporting the initial hypothesis that extending the use of the survey tool to aircraft operators can be effective. This chapter underscores the potential of Safety Culture surveys in various context as a valuable instrument even though the possibility of benchmarking between different types of organizations has still to be confirmed by further studies.

Overall, conducting a comparative analysis with previous literature enriches the interpretation of our study's findings, offering valuable insights into the broader landscape of Safety Culture within the aviation industry and the Science of measuring it.

5 ACHIEVEMENTS, LIMITATIONS AND RECOMMENDATIONS

5.1 FINAL REVIEW OF STUDY OBJECTIVES AND FINDINGS

Objective 1 - Overview of Safety Culture Importance

The thesis commenced with a comprehensive exploration of Safety Culture, elucidating its intrinsic significance within the aviation industry. By delving into the foundational principles and underlying dynamics of Safety Culture, the study aimed to provide a thorough understanding of why it is crucial for ensuring safety in aviation operations. The thesis underscored the critical role that Safety Culture plays in shaping organizational behavior, decision-making processes, and overall safety performance within the aviation sector and thus the importance of assessing and monitoring it.

Objective 2 - Analysis of Safety Culture Questionnaire Methodology

Following the initial overview, the study delved into a detailed examination of the EUROCONTROL Safety Culture Questionnaire methodology. This analysis involved scrutinizing the structure, design, and application process of the questionnaire to uncover its strengths and limitations. By systematically evaluating the questionnaire's effectiveness in measuring Safety Culture within aviation organizations, the research aimed to provide valuable insights into its utility as a diagnostic tool for assessing Safety Culture.

Objective 3 and Objective 4 - Successful Testing of Survey Application to Aircraft Operator

Subsequently, the study proceeded to test the application of the Safety Culture Questionnaire to a specific aircraft operator. Through a meticulously designed case study approach, the research aimed to assess the feasibility and effectiveness of using the questionnaire in a real-world organizational context. By administering the survey to employees within the aircraft operator and analyzing the resulting data, the study sought to gain insights into the prevailing Safety Culture within the organization. The successful

testing of the survey application demonstrated its adaptability and relevance to the aviation industry, highlighting its potential as a valuable tool for assessing and enhancing Safety Culture within aircraft operators.

5.2 LIMITATIONS OF THE TOOL AND RECOMMENDATIONS FOR PRACTICAL IMPLEMENTATION

While this study offers valuable insights into Safety Culture within Aircraft Operator, it is essential to acknowledge and address its limitations. By recognizing these limitations, we can ensure a nuanced interpretation of the findings and avoid misinterpretations or overgeneralizations.

1) Development of the Demographics Section

One crucial aspect to consider is the development of the demographics section. Accurate development of this section is paramount because it enables the utilization of filters within PowerBI to obtain insights into specific departments, thereby mapping Safety Culture more precisely and granularly. A well-constructed demographics section allows for targeted analysis, facilitating the identification of strengths and areas for improvement within different organizational units. Conversely, if this section is not developed correctly, the results may be non-significant or even misleading, leading to incorrect conclusions and ineffective solutions, undermining the success of the initiative. Therefore, meticulous attention to detail during the development of the demographics section is essential to ensure the validity and reliability of the survey data.

2) Risk of Treating Survey Data as Absolute Truths:

One limitation of this study lies in the inherent risk of treating the data obtained from the Safety Culture Survey as absolute truths. Whether positive or negative, taking survey results at face value without critical examination can lead to a disconnect from reality. It's crucial to recognize that survey responses represent perceptions rather than objective realities. Therefore, relying solely on survey data may obscure genuine problems or strengths within the organization. To mitigate this

limitation, it is imperative to supplement survey findings with other sources of data, such as incident reports, Safety audits, Safety Performance Indicators, trends and, mainly, targeted employee feedback sessions through Workshops. This triangulation of data sources provides a more comprehensive understanding of Safety Culture, allowing for a balanced assessment of organizational strengths and areas for improvement.

3)   Impulsive Corrective Actions:

Another limitation to consider is the temptation to implement corrective actions hastily in response to survey findings. While identifying areas for improvement is a crucial step, hastily implemented solutions may be ineffective or even exacerbate existing issues. Effective corrective actions require careful planning, staff involvement, and consideration of organizational context. Rushing into corrective actions without thorough analysis and deliberation can lead to wasted resources and unintended consequences. Therefore, it is essential to approach corrective actions with a strategic mindset, prioritizing evidence-based interventions backed by the feedback from Workshops tailored to address identified Safety Culture gaps.

4)   Limitation in Administering the Survey to Companies with Adequate Staff Numbers:

The effectiveness of the Safety Culture Survey relies on a sufficient number of participants to generate meaningful insights and ensure statistical reliability. Therefore, one limitation of this tool is the necessity to administer the survey to companies with a substantial number of employees. Companies with a limited workforce may struggle to meet the threshold required to visualize results for individual groups or departments accurately. Consequently, the insights gleaned from the survey may lack granularity, hindering the ability to identify specific areas of concern within the organization. To address this limitation, future research efforts should focus on developing strategies to adapt the survey methodology for use in smaller organizations while maintaining statistical robustness.

In conclusion, while this study provides valuable insights into Safety Culture within Aircraft Operator, it is essential to recognize and mitigate its limitations. By acknowledging the inherent constraints of the study, researchers and practitioners can ensure a more nuanced interpretation of the findings and foster continuous improvement in Safety management practices within the aviation industry.

5.3 LIMITATIONS OF THE STUDY

This study is not without its limitations, which should be carefully considered when interpreting the findings and drawing conclusions. The following are the primary limitations:

1) **Single Aircraft Operator Case Study:**

The study's focus on a single aircraft operator limits the generalizability of the findings to the broader aviation industry. Each operator may have unique organizational cultures, operational environments, and Safety management systems that could affect the results of the Safety Culture Survey differently. Therefore, caution is warranted when extrapolating the findings of this study to other aircraft operators without further validation through multi-organizational studies.

2) **Pending Workshops and Validation:**

At the time of publication, the workshops intended to validate the survey's applicability and effectiveness had not yet been conducted. These workshops are crucial for engaging with employees to gather their perspectives on Safety and the survey itself. Additionally, the workshops aim to define any corrective actions that may be necessary based on the survey results. Without this input from employees and stakeholders, the validation of the study's findings remains incomplete, and the effectiveness of any proposed corrective actions cannot be adequately assessed.

3) **Need for Longitudinal Survey Administration**

A comprehensive evaluation of the entire process, including the surveys, analysis, workshops, and

implementation and monitoring of corrective actions, requires a longitudinal approach. Conducting a second administration of the survey at a later time allows to assess the long-term effects of the interventions implemented based on the initial survey findings. This longitudinal perspective is essential for understanding the sustainability and effectiveness of Safety culture improvement efforts over time.

Addressing these limitations in future research endeavors will contribute to a more complete understanding of the effectiveness of SCQ to AOs.

5.4 CONTRIBUTION TO LITERATURE AND THE AVIATION INDUSTRY, RECOMMENDATIONS FOR FUTURE STUDIES AND APPLICATIONS

This study makes a significant contribution to both academic literature and the aviation industry by validating the use of a tool previously unexplored in the context of Aircraft Operators and Maintenance Organizations. The primary recommendation for future studies and applications stemming from this research revolves around expanding the utilization of this tool to a broader range of aircraft operators and aviation stakeholders in general.

The most crucial contribution of this study is the validation of the applicability of the Safety Culture Survey tool to Aircraft Operators and Maintenance Organizations, extending its utility beyond its original scope. Therefore, the following recommendations are proposed for future studies:

1. Comprehensive Analysis of Aircraft Operators' Results:

 Future research efforts should focus on administering the Safety Culture Survey to a diverse range of aircraft operators to conduct a comprehensive analysis of Safety Culture across the aviation industry. By collecting data from various operators, researchers can identify common trends, challenges, and best practices, facilitating a deeper understanding of Safety Culture within the sector.

2. Feasibility Study on Cross-Sectors Comparison:

It is advisable to conduct a feasibility study on the possibility of comparing Safety Culture Survey results among companies from different sectors within the aviation industry. This endeavor could lead to the creation of a European database of Safety Culture, offering a much more granular understanding of the factors characterizing Safety practices. By promoting cross-industry initiatives for monitoring and improvement, such as sharing best practices and lessons learned, this approach can encourage the development of a unified Safety Culture model at the European level. Additionally, it could serve as a repository of best practices, facilitating knowledge sharing and collaboration within the aviation community.

In conclusion, this study's validation of the Safety Culture Survey tool for Aircraft Operators and Maintenance Organizations opens up new avenues for research and practical applications in the aviation industry. By embracing these recommendations, researchers and practitioners can further advance the mapping and understanding of Safety Culture and drive improvements in Safety management practices across the industry.

6 CONCLUSIONS

In light of the extensive analysis and findings presented in this study, the application of the Safety Culture Survey to SIRIO has demonstrated apparent effectiveness. Based on the results obtained and the considerations outlined throughout this research endeavor, it can be concluded that the company has successfully mapped the Safety culture within its organization. At this stage of the study, it is evident that the Safety Culture Survey tool has proven to be highly beneficial in providing insights into both the strengths and areas for improvement in SIRIO's Safety culture.

The utilization of the Safety Culture Survey has allowed SIRIO to gain valuable insights into various facets of its Safety culture, providing a comprehensive understanding of its Safety management practices and organizational dynamics. By effectively mapping the Safety Culture, SIRIO is better equipped to identify best practices and areas for enhancement, thereby fostering a continuous improvement mindset within the organization.

Moving forward, the insights gleaned from the Safety Culture Survey will serve as a solid foundation for the upcoming workshops, which are crucial for validating the survey's applicability and effectiveness. These workshops will provide an opportunity for engaging with employees to gather their perspectives on Safety and the survey itself. Additionally, they will facilitate the formulation of tailored corrective actions based on the survey findings, ensuring that the identified areas for improvement are addressed effectively.

In conclusion, the analysis conducted in this study has clearly demonstrated the importance of the Safety Culture Questionnaire as a fundamental tool for organizations operating in the aviation sector. When used correctly, this tool provides crucial insights that enable organizations to gain a deep understanding of Safety culture and identify areas for improvement.

The information gathered through the Safety Culture Survey becomes a valuable resource only when critically analyzed and integrated into Safety management practices. When organizations

take the survey results seriously and take concrete steps to address identified deficiencies, there is a tangible improvement in the Safety culture within the organization.

This improvement in Safety culture is not just an end goal in itself but has a direct impact on Safety performance. An organization with a strong Safety culture is more likely to adopt safe behaviors and implement procedures and protocols that minimize operational risks. As a result, there is a reflection of increased Safety performance, which not only benefits the organization itself but also has a positive impact on the entire aviation sector.

Therefore, in light of the evidence presented in this study, it can be concluded that the fundamental hypothesis of the study, namely that the EUROCONTROL Safety Culture Survey is beneficial also to Aircraft Operators and that the use of the Safety Culture Survey leads to an improvement in Safety Culture and Safety Performance in aviation, are fully valid. The reason of that is because it keeps the conversation about the Culture alive at all cross-sectional levels of an Organization – i.e. frontline, middle management and senior management. This confirms the crucial importance of Safety Culture assessment tools and underscores the need for organizations to adopt evidence-based approaches to improve the Safety Culture through the organization.

BIBLIOGRAPHY

- *EUROCONTROL, SKYBRARY – Safety Culture in ATM "https://skybrary.aero/articles/safety-culture-atm," [Online].*

- *EUROCONTROL, SKYBRARY – Assessing Safety Culture in ATM "https://skybrary.aero/articles/assessing-safety-culture-atm" [Online].*

- *G. Hofstede, "Culture's Consequences: Comparing Values, Behaviors, Institutions and Organisations Across Nations," Thousand Oaks, 2001.*

- *J. Reason, "Safety Paradoxes and Safety Culture," Inquiry Control and Safety Promotion, vol. 7, 15 November 1999.*

- *EUROCONTROL, SKYBRARY – Safety Culture "https://skybrary.aero/articles/safety-culture," [Online].*

- *J. Reason, Managing the Risks of Organisational Accidents, 1997.*

- *P. Hudson, Applying the Lessons of High Risk industries to Health Care, 2003.*

- *The Health Foundation, "Measuring Safety Culture," February 2011.*

- *F. Guldenmund, "The Nature of Safety Culture: A Review of Theory ad Research," Safety Science, vol. 34, pp. 215-257, 2000.*

- *K. Mearns, B. Kirwan, T. W. Reader, J. Jackson, R. Kennedy and R. Gordon, "Development of a Methodology for Understanding and Enhancing Safety Culture," Safety Science, vol. 53, pp. 123-133, 2013.*

- *Reader TW, Noort MC, Shorrock S, Kirwan B. "Safety sans Frontières: An International Safety Culture Model". Risk Anal. 2015 May*

- *K. Mearns, R. Kennedy and K. Barry, "DEVELOPING A SAFETY CULTURE MEASUREMENT TOOLKIT (SCMT) FOR EUROPEAN ANSPS," Safety Science, January 2009.*

- *Beatriz Fernández-Muñiz, José Manuel Montes-Peón, Camilo José Vázquez-Ordás, "Safety culture: Analysis of the causal relationships between its key Dimensions", Journal of Safety Research, Volume 38, Issue 6, Pages 627-641, 2007.*

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- APPENDIX I -

SURVEY TIMELINE

SURVEY TIMELINE

Questionnaire period: Monday 12th February - Monday 4th March 2024	who	Week & Deadlines								
		15-20 Jan	22-23 Jan	29 Jan-3 Feb	5-9 Feb	12-16 Feb	19-23 Feb	26 Feb - 01 Mar	4-8 Mar	11-15 Mar
Send sample questionnaire, documents & timeline	Eurocontrol									
Check launch date with EUROCONTROL Communications	Eurocontrol									
provide questionnaire QR & link	Eurocontrol									
Draft launch email & select promotional image	both	draft	final							
Provide questionnaire demographics	SIRIO		draft	final						
Provide translation	SIRIO		draft	final						
Promotional material	SIRIO									
Setup Questionnaire with final demographics & languages	Eurocontrol			draft	final					
Provide final email distribution list	SIRIO			by Monday 29th						
Internal information / promotion	SIRIO	according to internal organisational needs								
Inform IT department for mass email on launch date	SIRIO									
Share questionniare as backup (Guido)	Eurocontrol									
confirm launch ok	both					12-feb				
provide participation rates	Eurocontrol					Mondays and Thursdays				
prepare reminder email if necessary	SIRIO							if necessary		
Decide on extension depending on participation rates	SIRIO							if necessary		
Close Survey & Cleanup Validate & PBI data	Eurocontrol								Close 4/3 @ 1700	
Provide Link to results & feedback file	Eurocontrol								if no extension	if extension

- APPENDIX II -

SAFETY CULTURE QUESTIONNAIRE

SIRIO Safety Culture Questionnaire

EUROCONTROL

Background Information

Safety culture determines the way we address safety at work, and is affected by our individual and shared attitudes, beliefs, perceptions and behaviours concerning safety. SIRIO wants to evaluate the safety culture, and needs your input to see where it is working well, and to identify any areas where improvements might be needed. This analysis is carried out independently by EUROCONTROL, using a safety culture survey tool which has been scientifically validated, and has been used with many companies and tens of thousands of Air Traffic Management staff across Europe.

Your individual responses are **anonymous and confidential**. The results of the survey will be reported at group level and **individuals cannot be identified**. The results will focus on trends (e.g. strengths and challenges) in safety culture across the different stakeholders involved in the survey, and data focusing on individuals will not be reported. The data will be collected and analysed by EUROCONTROL.

Instructions

Please take 10 minutes of your time to complete the survey. If possible, please complete all of the questions. Section D is for any other comments you wish to make.

Please ensure you click the 'Submit' button at the end of the survey to register your participation.

If you find a question that you do not understand or does not apply to you, do not answer it.

The survey will be available until 1700 on Monday the 4th of March.

Thank you in advance for your valuable contribution.

SIRIO Safety Culture Questionnaire

EUROCONTROL

* Required

SECTION A – Demographics

The information supplied in this section provides general demographic details. Individual data will remain completely confidential and it will not be possible to identify you personally. Only group summary data will be used in analysis.

A01 In which department do you work?
*

◯ Administrative Dept

◯ Management System Staff (e.g. Safety, Compliance, Ground, Security)

◯ Flight Operations / Training

◯ CAMO / AMO

◯ Other

A02 What do you consider to be your <u>primary</u> role (>50% of your time)?
*

○ Administrative Staff (Accounting/Finance Staff, General Services, IT)

○ Pilot / Flight Attendant

○ Ground Staff (Safety/Compliance, Training/Ground, FCO, CAMO Officer, AMO Officer, Logistics Officer)

○ Maintenance Technician

○ Other

A03 Where do you normally work in your primary role? *

○ Main Base (Linate)

○ Secondary Base (Ancona, Bologna, Perugia, Treviso)

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SIRIO Safety Culture Questionnaire

SECTION B – General

Below is a list of statements about **ATM safety** in your organisation. Please indicate the extent to which you agree/disagree with each one by selecting one box for each question.

For each statement, select the rating that corresponds most closely to your <u>opinions</u> about how your organisation currently works (not how it should work, used to work, or might work in future).

If you find a question that you do not understand or does not apply to you - <u>do not answer it</u>.

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
B01 My colleagues are committed to safety	○	○	○	○	○
B02 Voicing concerns about safety is encouraged	○	○	○	○	○
B03 We have sufficient staff to do our work safely	○	○	○	○	○
B04 Everyone I work with in this organisation feels that safety is their personal responsibility	○	○	○	○	○
B05 My manager is committed to safety	○	○	○	○	○
B06 Staff have a high degree of trust in management with regard to safety	○	○	○	○	○
B07 I have confidence in the people that I interact with in my normal working situation	○	○	○	○	○
B08 People who report safety-related occurrences are treated in a just and fair manner	○	○	○	○	○

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
B09 People in this organisation share safety-related information	○	○	○	○	○
B10 My manager takes action on the safety issues we raise	○	○	○	○	○
B11 Information about safety-related changes within this organisation is clearly communicated to staff	○	○	○	○	○
B12 We get timely feedback on the safety issues we raise	○	○	○	○	○
B13 My involvement in safety activities is sufficient	○	○	○	○	○
B14 If I see unsafe behaviour by any of my colleagues I would talk to them about it	○	○	○	○	○
B15 People who raise safety issues are seen as troublemakers	○	○	○	○	○

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
B16 I would speak to my manager if I had safety concerns about the way that we work	○	○	○	○	○
B17 There is good communication up and down the organisation about safety	○	○	○	○	○
B18 Changes to the organisation, systems and procedures are properly assessed for safety risk	○	○	○	○	○
B19 Safety is taken seriously in this organisation	○	○	○	○	○
B20 My team works well with the other teams within the organisation	○	○	○	○	○
B21 We learn lessons from safety-related incident or occurrence investigations	○	○	○	○	○
B22 My manager would always support me if I had a concern about safety	○	○	○	○	○
B23 We have appropriate support from safety specialists	○	○	○	○	○

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
B24 I have good access to information regarding safety incidents or occurrences within the organisation	◯	◯	◯	◯	◯
B25 There are people who I do not want to work with because of their negative attitude to safety	◯	◯	◯	◯	◯
B26 I know what the future plans are for the development of the services we provide	◯	◯	◯	◯	◯
B27 Other people in this organisation understand how my job contributes to safety	◯	◯	◯	◯	◯
B28 Senior management takes appropriate action on the safety issues that we raise	◯	◯	◯	◯	◯
B29 Safety is improving in this organisation	◯	◯	◯	◯	◯

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SIRIO Safety Culture Questionnaire

SECTION C – Operational & Technical

Please indicate the extent to which you agree/disagree with the following statements

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
C01 Incidents or occurrences that could affect safety are properly investigated	○	○	○	○	○
C02 We have the equipment needed to do our work safely	○	○	○	○	○
C03 I read reports of incidents or occurrences that are relevant to our work	○	○	○	○	○
C04 The procedures describe the way in which I actually do my job	○	○	○	○	○
C05 Good communication exists between Operations and Engineering/ Maintenance to ensure safety	○	○	○	○	○
C06 I am satisfied with the level of confidentiality of the reporting and investigation process	○	○	○	○	○
C07 We often have to deviate from procedures	○	○	○	○	○
C08 I receive sufficient safety-related refresher training	○	○	○	○	○

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
C09 A staff member who was being prosecuted for an incident involving a genuine error or mistake would be supported by the management of this organisation	○	○	○	○	○
C10 Maintenance always consults Operations about plans to maintain operational equipment	○	○	○	○	○
C11 Adequate training is provided when new systems and procedures are introduced	○	○	○	○	○
C12 We are sufficiently involved in safety risk assessments	○	○	○	○	○
C13 Incident or occurrence reporting leads to real safety improvements in this organisation	○	○	○	○	○
C14 I often have to take risks that make me feel uncomfortable about safety	○	○	○	○	○
C15 We are sufficiently involved in changes to procedures	○	○	○	○	○
C16 We openly discuss incidents or occurrences in an attempt to learn from them	○	○	○	○	○

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
C17 A staff member who regularly took unacceptable risks would be disciplined or corrected in this organisation	○	○	○	○	○
C18 Operational staff are sufficiently involved in system changes	○	○	○	○	○
C19 The procedures associated with my work are appropriate	○	○	○	○	○
C20 I have sufficient training to understand the procedures associated with my work	○	○	○	○	○

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SIRIO Safety Culture Questionnaire

SECTION D – Comments and Feedback

Do you have ideas to improve safety? If so, please note them here.

Enter your answer

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- APPENDIX III -

SUMMARY OF SIRIO RESULTS FROM POWER BI

Safety Culture Questionnaire for SIRIO
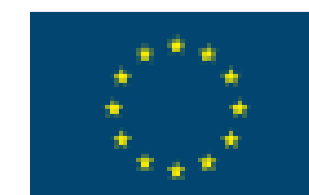
SURVEY PARTICIPATION			
Department / Unit ▲	**Contacts**	**Participants**	**Response Rate**
Administrative Dept	15	9	60.0%
CAMO / AMO	46	31	67.4%
Flight Operations / Training	50	35	70.0%
Management System Staff (e.g. Safety, Compliance, Ground, Security)	6	7	116.7%
Other	0	2	
Total	**117**	**84**	**71.8%**

This dashboard contains the calculated results of the safety culture questionnaire for the organisation.
- The cover page shows the participation rates of the questionnaire.
- The overview shows the units & roles participation based on those who responded to the questionnaire.
- The results are organised according to grouped questions (dimensions).
- Radar charts show the mean values for each dimension.
- According to the demographics in the organization, participants were presented with general questions only (section B) or both the general and the Operational & technical questions (sections B & C). It is possible to choose results per department/unit and by roles, however, it is recommended *not* to combine results for roles answering section B questions only with those answering both sections B & C.
- The results of the questionnaire are intended as a guide and input into discussions or workshops with the relevant groups of participants/staff.

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Organisation

SIRIO

Demographics & Statistics per dimension

| 84 | 89.93% |
| Participant | % Responses to Questions |

| 5 | 5 |
| Departments | Roles |

EUROCONTROL

Department	Role	Location
All	All	All

See more details →

A01 In which department do you work?

- Flight Operation... 41.67%
- CAMO / AMO 36.9%
- Administrativ... 10.71%
- Management System St... 8.33%

A02 What do you consider to be your primary role?

- Pilot / Flight Atte... 35.71%
- Ground Staff (Safety/Compli...) 28.57%
- Mainten... 17.86%
- Administrative St... 13.1%
- Other 4.76%
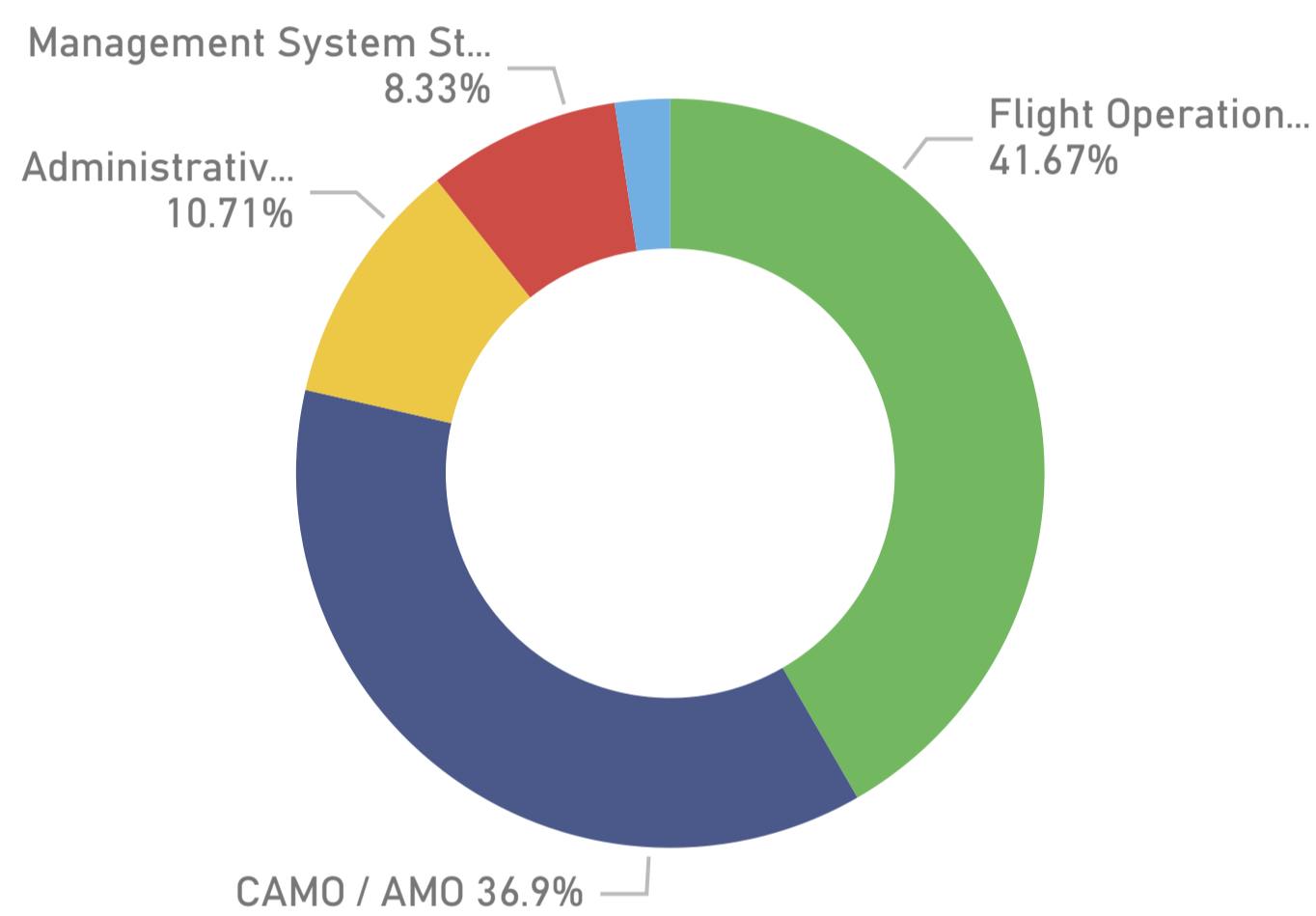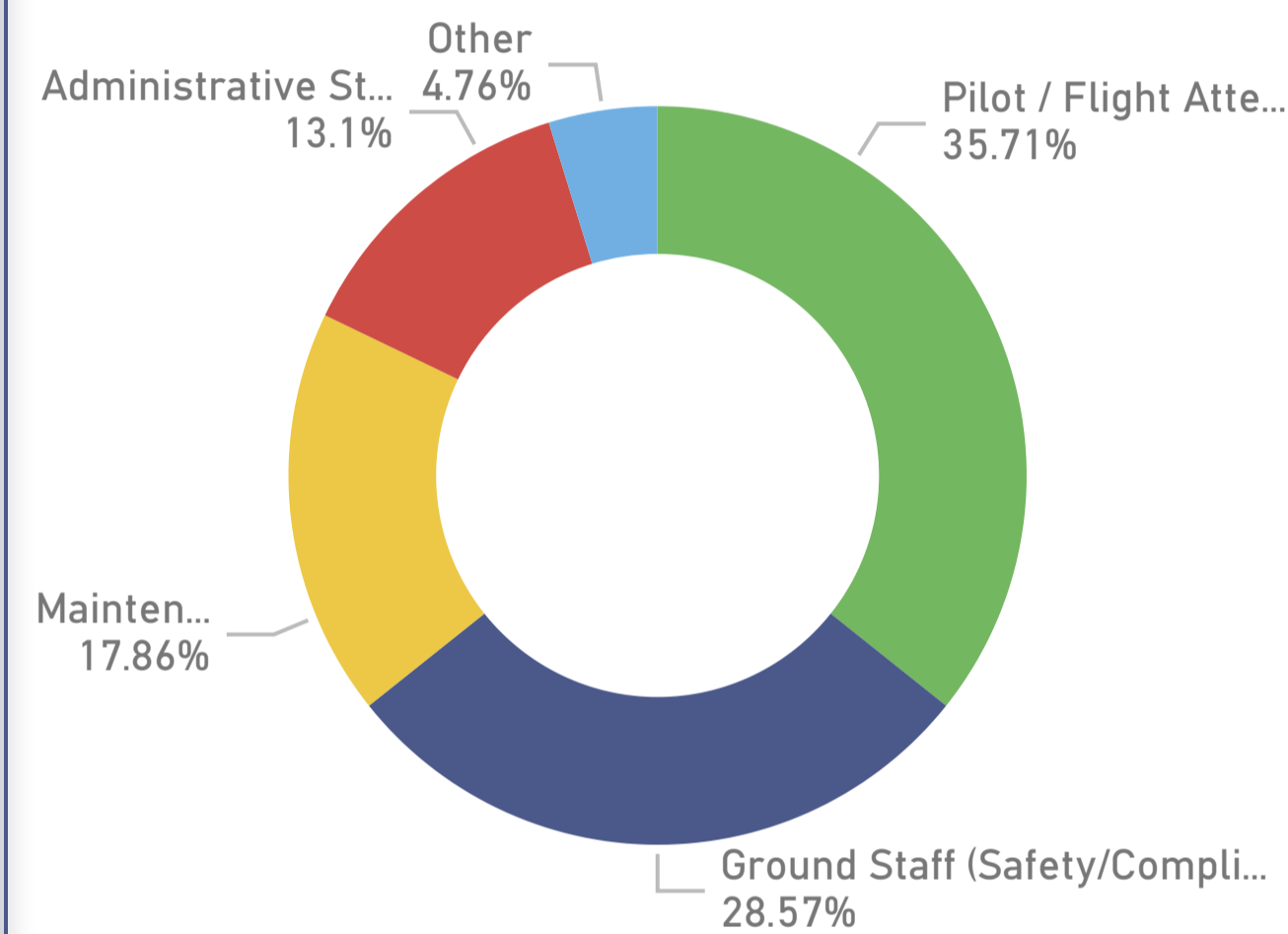
See other Demographics →

Mean Dimensions

Legend
- Mean   Max

Radar chart values:
- Collaboration and involvement: 3.63
- Colleague commitment to safety: 3.85
- Communication and learning: 3.77
- Independent items: 3.96
- Just culture and reporting: 3.87
- Managers' commitment to safety: 3.89
- Procedures & training: 3.79
- Risk Handling: 3.77
- Staff and equipment: 3.90
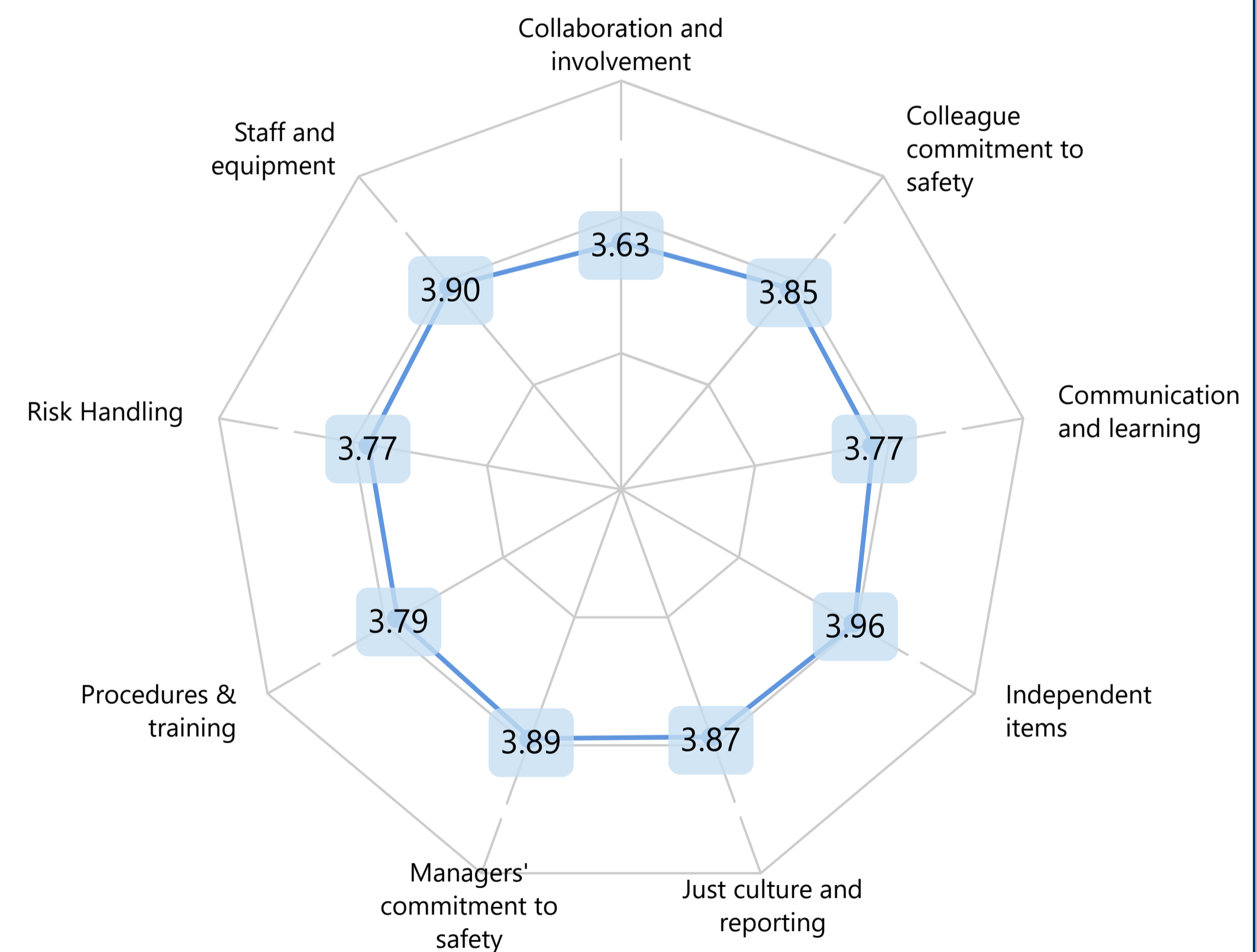
Dimension statistics

Description	N	Mean	Min	Max	Range	Median	Standard Deviation
Collaboration and involvement	72.30	3.63	1.00	5.00	4.00	4.00	0.88
Colleague commitment to safety	82.33	3.85	1.33	5.00	3.67	4.00	0.73
Communication and learning	77.00	3.77	1.00	5.00	4.00	3.88	0.82
Independent items	82.00	3.96	1.00	5.00	4.00	4.00	0.82
Just culture and reporting	74.90	3.87	1.00	5.00	4.00	4.00	0.80
Managers' commitment to safety	79.80	3.89	1.00	5.00	4.00	4.00	0.76
Procedures & training	67.60	3.79	1.20	5.00	3.80	4.00	0.75
Risk Handling	70.00	3.77	1.00	5.00	4.00	4.00	0.89
Staff and equipment	76.67	3.90	2.00	5.00	3.00	4.00	0.70
Total	**75.02**	**3.80**	**1.10**	**5.00**	**3.90**	**3.98**	**0.81**

See Radar by Department →

- APPENDIX IV –

EUROCONTROL INTERNAL REVIEW OF SAFETY CULTURE QUESTIONNAIRE ADMINISTRATION FOR SIRIO

European Safety Culture Programme

SIRIO 2024 Safety Culture Questionnaire Results

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EDITION HISTORY

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TABLE OF CONTENT

1   Introduction

1.1   Safety Culture Questionnaire

The safety culture questionnaire is the first phase of a EUROCONTROL Safety Culture Survey designed to help identify where an organisation could improve the safety of air traffic management (ATM).   A second phase involves workshops with representative staff to discuss and interpret the questionnaire findings with different staff groups. The second phase is arranged locally by the ANSP organisation.

1.2   Document classification

This document is classified Amber.

2   Questionnaire Structure

2.1   Generic structure

The EUROCONTROL Safety Culture Questionnaire contains four sections.

(A)   Demographics – 3 questions applicable for all
(B)   General - 29 questions applicable for all
(C)   Operational - 20 questions for operational staff
(D)   Feedback –open question applicable for all

The survey introduction text contains the following information for participants:

i)   Individual responses are anonymous and will be kept confidential

ii)   Results are reported at group level – individuals cannot be identified

iii)   We want to understand opinions about how the organisation currently works, <u>not</u> about how it should work

iv)   If you find a question that you do not understand or does not apply to you – <u>do not answer it</u>

v)   Time to complete all sections of the survey is approximately 10 minutes.

2.2   SIRIO-specific contents

2.2.1   Languages

- The questionnaire was available in English and Italian

2.2.2   Demographics

- A01 *in what department do you work?*

  Answer choices were presented as follows:

  i)   Administrative Dept
  ii)   Management System Staff (eg. Safety, Compliance, Ground, Security)
  iii) Flight Operations / Training
  iv)   CAMO - AMO
  v)   Other

- A02 what do you consider to be your <u>primary</u> role (>50% of your time)?

  Answer choices and relevant sections of the questionnaire were presented as follows:

  i)   Administrative Staff (Accounting/Finance Staff, General Services, IT) - s
  ii)   Pilot – Flight Attendant
  iii) Ground Staff (Safety/Compliance, Training/Ground, FCO, CAMO Officer, AMO Officer, Logistics Officer)
  iv)   Maintenance Technician
  v)   Other

- A03 Where do you normally work, in your primary role?

  Answer choices were presented as follows:

  i)   Main Base (Linate)
  ii)   Secondary Base (Ancona, Bologna, Perugia, Treviso)

3   Questionnaire delivery

The electronic questionnaire was distributed to SIRIO staff by email from EUROCONTROL (European Safety Culture Programme).

The questionnaire was initially available from Monday 12th of February until to Monday 4th of March 2024. The period was extended by 1 week and closed on Monday 11th of March.

A total of 84 valid responses were received, giving an overall response rate of 71.8%.

4   Questionnaire results

4.1   Result analysis methodology

- Once closed, the questionnaire data was checked, cleansed, and organised for analysis.

- Using Power BI, descriptive analyses (number of responses, range, min, max, mean, standard deviation) were made on responses to each question and grouped into pre-defined dimensions.

4.2   Presentation of results

- Results are shared as a report in the Microsoft Power BI App. Access to the report is given to the email address of the people within the organisation who need to visualize it.

- Feedback gathered in plain text from Section D of the questionnaire was provided separately to the organisation.

Questionnaire results are presented as follows:

- <u>Cover page</u>: Participation and response rates per demographic audience.

- <u>Overview</u>: Demographic repartition of the responses received.

  <u>Dimension statistics</u>: This section shows the average number of responses (N), Mean, Minimum (Min), Maximum (Max), Range, Median and Standard Deviation (SD) ***per group of questions (dimension)***. The mean score for each dimension is shown on a Radar chart. Scale of values is 1-5.

- <u>Descriptive statistics per question</u>: Statistics **per question** represented as a percentage within each category on a scale of favourability.

- <u>Dimension graphs</u>: Graphical representation of Likert scale ***per group of questions (dimension)*** presented in 100% stacked bar charts. Percentages are rounded to the nearest 1 percent.

- <u>Descriptive Statistics per Department – comparison:</u> Statistics per question for each department. Two views of the same table giving the possibility to filter and compare departments per Dimension and/or Question.

Appendix

A.   SIRIO Organisation Safety Culture Questionnaire Results

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