Safety Management System and Safety Culture Working Group (SMS WG)

SAFETY CULTURE FRAMEWORK FOR THE ECAST SMS-WG

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EXECUTIVE SUMMARY

This document has been prepared by the EASA ECAST SMS Working Group and provides guidance to organisations on the concept of Safety Culture. While no requirements regarding Safety Culture are included in the EASA rules on organisation and accountabilities within a Safety Management System (NPA 2008-22c) or in the acceptable means of compliance, the need to establish 'a culture of safety' is part of the Basic Regulation of EASA. Also, the ECAST SMS Working Group is convinced that an SMS cannot be effective without an appropriate Safety Culture. Therefore, this document provides guidance to organisations in understanding the concept of Safety Culture and assessing Safety Culture in their own organisation

The guidance on Safety Culture provided in this document is based on a synthesis [Montijn and de Jong] of the main Safety Culture concepts and best practices described in literature and of the most recent developments in this field. It is aimed at all organisations bearing a responsibility for safety in aviation.

The following definition of Safety Culture is provided:

Safety Culture is the set of enduring values and attitudes regarding safety issues, shared by every member of every level of an organization. Safety Culture refers to the extent to which every individual and every group of the organization is aware of the risks and unknown hazards induced by its activities; is continuously behaving so as to preserve and enhance safety; is willing and able to adapt itself when facing safety issues; is willing to communicate safety issues; and consistently evaluates safety related behaviour.

To support the assessment and management of Safety Culture, the six main components (called Characteristics) of Safety Culture are described:

- *Commitment*
- *Behaviour*
- *Awareness*
- *Adaptability*
- *Information*
- *Justness*

The various types of aviation organisations (airlines, ATC, airports, MROs, CAA's, etc.) each have their own specific organisational structure, processes and operational environment. These domain-specific circumstances necessitate a domain-specific approach to Safety Culture. For this reason, the paper provides guidance on how the Characteristics may be assessed though the use of domain-specific questions. This approach allows for a domain-specific assessment and management of Safety Culture based on a framework that is common to all organisations bearing a responsibility for aviation safety.

By adopting the definition and main components of Safety Culture described in this paper, a common understanding and language of Safety Culture is established. This will facilitate the ability of different types of organisations to communicate about Safety Culture, to learn from each other, and to work on safety culture together.

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Contents

1. Purpose

The purpose of this paper is to propose – for consideration by the ECAST SMS-WG - a small Safety Culture framework for use by all interested actors in civil aviation in Europe.

2. Introduction

Safety Management Systems (SMS) are increasingly being introduced in aviation, among others because of the provisions relating to safety management in ICAO Annexes 6, 11 and 14, and EASA NPA 200822C. There is however no specific requirement regarding Safety Culture in the EASA rules other that a general provision in the EASA Basic Regulation regarding the need to install 'a culture of safety'.

Nevertheless, a strong Safety Culture is generally considered as a vital condition to a well functioning SMS. It is sometimes said that is it is well possible to have a good Safety Culture without a formal SMS, but is not possible to have an effective SMS without a good Safety Culture.

For this reason, the SMS Working Group of ECAST has been tasked to propose Safety Culture reference material.

As Safety Culture is still an emerging issue and since the introduction of the ICAO and EASA Safety Management requirements will expedite Safety Culture activity across Europe, now is a good time to provide reference material. Not only will this help organisation to get to grips with the matter swiftly, but it does also provide a unique opportunity to achieve a level commonality, a common language and common reference data for Safety Culture in Europe.

In order to be useful, the Safety Culture framework must be at a sufficiently high level to allow broad adoption and use by all actors, not just one or a few. At the same time the framework must be sufficiently detailed to be meaningful for deeply understanding and improving an organisations specific Safety Culture.

The framework described in this paper is based on the available body of studies and best practices.

3. Rationale for a 'framework of frameworks'.

Now that many organisations are getting ready to introduce formal SMS programs in 2009, it is important to try and arrive at a common Safety Culture framework, thus facilitating the introduction of a Safety Culture as an integral part of Safety Management. It will be easier for many organisations to adopt a framework that is widely used.

The less a concept is anchored in 'the laws of physics', however, the more it is a matter of beliefs[1], and the more people tend to take a 'religious' approach in adopting or rejecting definitions. Such is the case for Safety Culture frameworks. Also, the belief that specific domains of aviation are different from others to the extent that specific, dissimilar Safety Culture frameworks are needed, can cause delay in reaching agreement on a common

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[1] This is not to say that the work done to develop such frameworks is not scientifically sound or not based on quality research and data. On the contrary, excellent peer-reviewed scientific work underlies most Safety Culture frameworks. It is only to say that people tend to feel more at liberty to make their own judgement and not consider the elements of a Safety Culture framework as facts, than in other, more technical domains.

framework. Finally, sometimes vested interest in specific frameworks also plays a role. The consequence could be a lengthy process and a result that is too generic to be really useful.

To overcome such obstacles, a scientific review[2] has been conducted of the main existing and emerging Safety Culture frameworks, primarily in aviation and including Eurocontrol, but also in other industries such as the oil & gas industry. The findings of this review have been used to develop a Safety Culture framework consisting of all the key common elements of the various existing frameworks. The framework described in this working paper is based on this review.

4. Definition of Safety Culture

Sometimes the notion of a Safety Culture is described in a formal <u>definition</u>, and sometimes it is described in the form of a <u>slogan</u> (e.g. 'how people behave when no one is watching').

Slogans are useful to convey the general notion of Safety Culture, but which slogan is preferred is largely a matter of personal preference and therefore hardly something to be included in reference material for general use across Europe. More importantly, Safety Culture slogans mix up the general notion of Safety Culture and specific Safety Culture maturity levels, and they do not provide a sufficient basis for understanding, assessing or improving Safety Culture. Therefore, slogans are not used as the basis for a Safety Culture framework here.

Safety Culture definitions tend to be considered too academic. Therefore, two levels of one definition are used. The top-level will be useful in describing what Safety Culture is in a way that is easy to understand. An extension to a full definition will support the level of rigour needed to univocally answer the more difficult questions around Safety Culture.
Because Safety Culture is often perceived as a vague concept defying concrete measures, such rigour is vital in enabling effective assessment and management.

The top-level definition is:

Safety Culture is the set of enduring values and attitudes regarding safety, shared by every member of every level of an organization.

The full definition of Safety Culture is:

Safety Culture is the set of enduring values and attitudes regarding safety issues, shared by every member of every level of an organization. Safety Culture refers to the extent to which every individual and every group of the organization is aware of the risks and unknown hazards induced by its activities; is continuously behaving so as to preserve and enhance safety; is willing and able to adapt itself when facing safety issues; is willing to communicate safety issues; and consistently evaluates safety related behaviour.

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[2] C. Montijn and H. de Jong, A synthesis of the literature on safety culture: definitions, characteristics, indicators and classification scheme. Proceedings of the Eurocontrol annual Safety R&D seminar, Rome, Italy, 24-26 October 2007.

5. Safety Culture framework

From the review of the main existing and emerging Safety Culture frameworks in aviation and beyond, we know that Safety Culture is a multi-dimensional construct. To capture the common and key-elements of the various leading frameworks, six dimensions are needed. These dimensions are called **Characteristics**. The six Characteristics are:

- *Commitment*
- *Behaviour*
- *Awareness*
- *Adaptability*
- *Information*
- *Justness*

– **Commitment** reflects the extent to which every level of the organization has a positive attitude towards safety and recognizes its importance. Top management should be genuinely committed to keeping a high level of safety and give employees motivation and means to do so as well.
– **Behaviour** reflects the extent to which every level of the organization behaves such as to maintain and improve the level of safety. From the management side, the importance of safety should be recognized and everything needed to maintain and enhance safety records should be put in place.
– **Awareness** reflects the extent to which employees and management are aware of the risks for themselves and for others implied by the organization's operations. Employees and management should be constantly maintaining a high degree of vigilance with respect to safety issues.
– **Adaptability** reflects the extent to which employees and management are willing to learn from past experiences and are able to take whatever action is necessary in order to enhance the level of safety within the organization.
– **Information** reflects the extent to which information is distributed to the right people in the organization. Employees should be encouraged to report safety concerns. Work related information has to be communicated in the right way to the right people in order to avoid miscommunication that could lead to hazardous situations.
– **Justness** reflects the extent to which safe behaviour and reporting of safety issues are encouraged or even rewarded and unsafe behaviour is discouraged.

It is a given that some organisations already have their own Safety Culture Framework and are happy using it. This document is not intended to replace any of that. At the same time, the framework described here captures some of the more recent advances in the international understanding of Safety Culture. As a consequence, some of the terminology in the framework description differs from some of the terminology used by some actors in the industry. For example, in some of the established Safety Culture frameworks the *Justness* characteristic is captured by the term 'Just Culture[3]'. Some additional information regarding the relationship between the Safety Culture framework described in this paper and the Safety Culture dimesions proposed by James Reason is provided in Appendix C.

The Characteristics are still at a fairly high level. They need to be expressed in more measureable terms. In the framework these are called **Indicators**. Each of the six Characteristics is expressed in several indicators as shown below.

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[3] The term Just Culture is not used here because it suggests that Safety Culture and Just Culture are separate things whereas it is essential to the framework described that Justness is an integral Characteristic of Safety Culture as are the other Characteristics. Organisations using the Just Culture concept can of course keep using that.

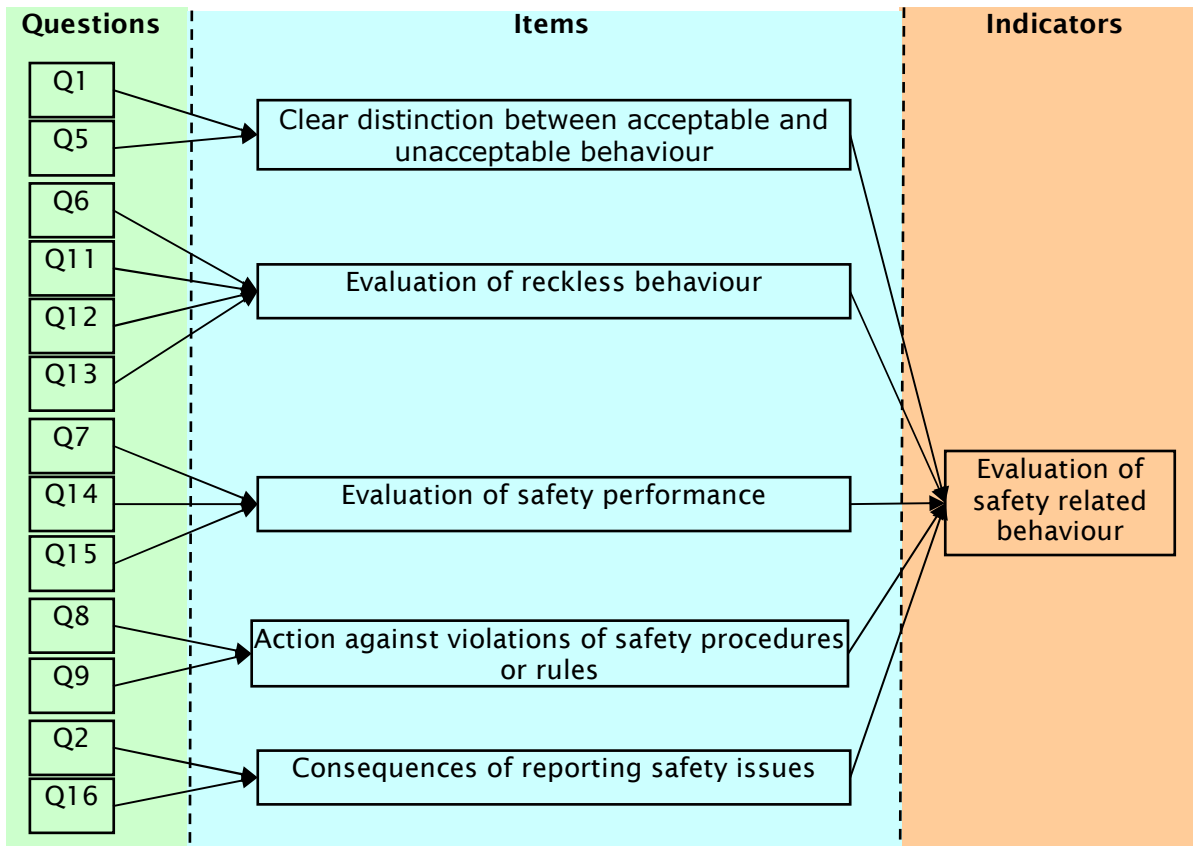| Characteristic	Indicators
Commitment	– Management concern – Perception of importance of safety – Prioritization of safety – Safety procedures and requirements – Personal involvement and responsibility for safety
Behaviour	– Employee behaviour with respect to safety – Mutual expectations and encouragement – Job satisfaction – Adequate equipment
Awareness	– Attitude towards unreported hazards – Awareness of job induced risk – Concern for safety
Adaptability	– Pro-activity to prevent negative happenings – Actions with respect to negative happenings – Employee input
Information	– Availability of information – Communication of work related information – Training – Safety issues reporting system – Willingness to use the reporting system – Consequences of safety reports – Communication of safety related information – Information exchange about safety issues
Justness	– Evaluation of safety related behaviours – Perception of evaluation – Passing of responsibility

Table 1 Safety Culture indicators

Just Culture is clearly an element of the framework (in the Justness Characteristic or component). Throughout the literature on Safety Culture it is quite obvious that Justness is indeed an indispensible component of Safety Culture. One might say that in the same way an effective Safety Management program is not feasible without an adequate Safety Culture, an adequate Safety Culture is not feasible without an appropriate level of Justness.

Just Culture has been the subject of much debate over the last decade, and sometimes Just Culture is separated from the Safety Culture framework for reasons of political or international sensitivity or because it is difficult to influence the legal aspects of a Just Culture.
In the framework, Justness is one of the six main characteristics of the Safety Culture of an organisation. The legal environment outside of an organisation is not a part of that organisation's Safety Culture, but is potentially of great relevance to its Safety Culture.

In order to support the assessment of Safety Culture (which is the topic of the next paragraph 6) an additional layer of description is sometimes used. This layer of description, which is called the **Item**-level, is meant to make it easier to structure interviews or to formulate questions for a survey. To illustrate the concept, a set of Items belonging to the Indicator 'Evaluation of safety related behaviours' (which belongs to the *Justness* Characteristic) is

shown in the figure below. Appendix A lists example items that may be used when developing an organisation-specific Safety Culture Checklist.

Figure 2   One Indicator of the Justness Characteristic and related Items and Questions
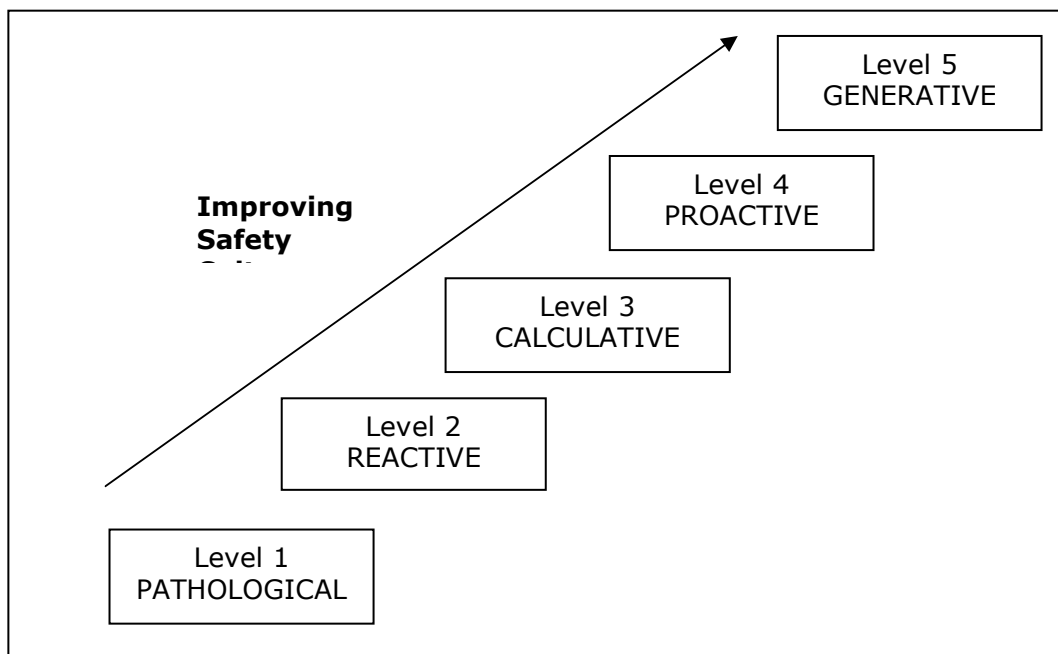
6. Assessing Safety Culture maturity

Beyond the level of the Indicators or (if used) the level of Items, the differences between various domains in aviation and even within a single organisation become too large to allow the use of common terminology. Therefore, when assessing Safety Culture (through e.g. surveys, interviews or workshops), question sets should be used that are not common across the industry, but that are specific for a particular domain (e.g. maintenance, flight ops or ATC), or for a particular group of employees within an organisation (e.g. operational personnel, staff and management). This is necessary because detailed questions relevant for an air traffic controller might be meaningless to an aircraft maintenance engineer and vice versa.

It is very important that these questions are based on the common set of Characteristics and Indicators. Not only will this ensure consistency with a common Safety Culture framework, but it will also provide a common basis for communicating about Safety Culture within and between organisations and aviation domains and it will allow the swift and consistent build-up of a body of reference data.

When assessing Safety Culture using questionnaires, interviews or other techniques, it is very important that adequate techniques are used (such as a mix of positive and negative questions) to prevent respondents from giving desired answers. Many other considerations apply which go beyond the scope of this working paper.

The results of a Safety Culture assessment are expressed in a score indicating the level of maturity of the Safety Culture present in the organisation. Five maturity levels are commonly used as shown in figure 2.

Figure 2 Safety Culture maturity levels according to Hudson

While we wish to stay away from slogans in the Safety Culture framework, short indications of the meaning of the different Safety Culture maturity levels are just that. More elaborate descriptions of the maturity levels are provided in the Appendix.

Level 1 (Pathological):   Who cares as long as we're not caught

Level 2 (Reactive):   Safety is important, we do a lot every time we have an accident

Level 3 (Calculative):   We have systems in place to manage all hazards

Level 4 (Proactive):   We work on the problems that we still find

Level 5 (Generative):   Safety is how we do business around here

Because a Safety Culture score is provided for each of the six Characteristics of the Safety Culture framework, and for each of the indicators of the Characteristics and because very specific questions (and answers) underlie the scores found, it will be possible to give detailed examples and explanations of why the Safety Culture has been assessed to be at a specific maturity level and where improvement efforts might be focussed.

Appendix A Example Checklist Items

Characteristic	Indicator	Example Checklist Items
Commitment	*Management concern*	• Management's decision making with respect to safety • Management's provision of adequate resources
	Perception of importance of safety	• Importance of safety issues • Employees' concern for safety
	Prioritization of safety	• Priority of safety over profit and performance • Investment of money and effort to improve safety
	Safety procedures and requirements	• Review of safety procedures and routines • Expectation with regard to following safety procedures
	Personal involvement and responsibility	• Employees' personal responsibility for safety • Management behaviour with respect to unsafe operations or activities
Behaviour	*Employee behaviour with respect to safety*	• Prevention of accidents and incidents by employees • Unnecessary risk taking
	Mutual expectations and encouragement	• Acquirement of colleagues' respect by safe records • Mutual expectations of employees regarding safe behaviour
	Job satisfaction	• Contact with colleagues • Appreciation of work
	Adequate equipment	• Access to equipment • Condition of equipment
Awareness	*Awareness of job induced risk*	• Awareness by management and employees of own risk on the job • Awareness by management and employees of others' risk induced by the job
	Attitude towards unknown hazards	• Belief in the existence of unidentified hazards • Good practice covers more than known hazards
	Concern for safety	• Exaggeration of safety concern • Importance of safety for business continuity
Adaptability	*Pro-activity to prevent occurrences*	• Occurrences not the only input for safety improvement • Autonomous searching of safety issues by employees
	Actions with respect to occurrences	• Actions upon reporting safety issues, incidents or accidents • Follow-up of the improvements implemented
	Employee input	• Encouragement of employees to suggest improvements • Assignment of right persons to solve problems

Information	*Availability of information*	• Availability of work related information • Clarity of instructions	
	Communication of work related information	• Communication between different teams/units • Clarity about who shall communicate which work related information to who	
	Training	• Safety training • Emergency training	
	Safety issues reporting system	• Perception of importance of safety issues reporting system • Encouragement to report safety issues	
	Willingness to use the reporting system	• Willingness to report minor incidents • Possibility for anonymous reporting	
	Consequences of safety reports	• Appreciation of employees reporting safety issues • Satisfaction with the way safety reports are dealt with.	
	Communication of safety related information	• Communication of safety issues to all employees • Information of employees of changes affecting safety	
	Information exchange about safety issues	• Talking about safety issues amongst employees • Review of events	
Justness	*Evaluation of safety related behaviours*	• Clear distinction between acceptable and unacceptable behaviour • Consequences of reporting safety issues	
	Perception of evaluation	• Fair judgment after safety occurrences • Clarity of evaluation system	
	Passing of responsibility	• Acknowledgement of own errors by management • Looking for scapegoat after safety occurrences	

Appendix B   Safety Culture maturity levels

The following descriptions of the five levels of Safety Culture maturity have been adopted from Hudson, and have not been made specific to Aviation.

- **Level 1: Pathological/emerging**

Safety is defined in terms of technical and procedural solutions and compliance with regulations and is not seen as a key business risk and the safety department is perceived to have primary responsibility for safety. Many accidents are seen as unavoidable and as part of the job. Most frontline staff is uninterested in safety and may only use safety as the basis for other arguments (e.g. changes in shift systems).

- **Level 2: Reactive/managing**

The organisation's accident rate is average for its industrial sector but they tend to have more serious accidents than average. Safety is seen as a business risk and management time and effort is put into accident prevention. Safety is solely defined in terms of adherence to rules and procedures and engineering controls. Accidents are seen as preventable. Managers perceive that the majority of accidents are solely caused by the unsafe behaviour of front-line staff. Safety performance is measured in terms of lagging indicators such as lost-time incident (LTI) and safety incentives are based on reduced LTI rates. Senior managers are reactive in their involvement in health and safety, i.e. they use punishment when accident rates increase and look for fixes to accidents and incidents after they happen.

- **Level 3: Calculative/involving**

Accident rates are relatively low, but they have reached a plateau. The organisation is convinced that the involvement of the frontline employee in health and safety is critical for future improvements but not for the current operations. Managers recognise that a wide range of factors cause accidents and the root causes often originate from management decisions. A significant proportion of frontline employees are willing to work with management to improve health and safety. The majority of staff accepts personal responsibility for their own safety. Safety performance is actively monitored and the data is used effectively. The organization has systems in place to manage hazards; however, the system is applied mechanically.

- **Level 4: Proactive/cooperating**

The majority of staff in the organisation is convinced that health and safety is important from both a moral and economic point of view. Managers and frontline staff recognise that a wide range of factors cause accidents and the root causes are likely to come back to management decisions. Frontline staff accept personal responsibility for their own and others' safety. The importance of all employees feeling valued and treated fairly is recognised. The organisation puts significant effort into proactive measures to prevent accidents. Safety performance is actively monitored using all data available. Non-work accidents are also monitored and a healthy lifestyle is promoted.

- **Level 5: Generative/continually improving**

The prevention of all injuries or harm to employees (both at work and at home) is a core company value. The organisation has had a sustained period (years) without a recordable accident or high potential incident, but there is no feeling of complacency. They live with the paranoia that their next accident is just around the corner. The organisation uses a range of indicators to monitor performance but it is not performance-driven, as it has confidence in its safety processes. The organisation is constantly striving to be better and find better ways of improving hazard control mechanisms. All employees share the belief that health and safety is a critical aspect of their job and accept that the prevention of non-work injuries is important. The company invests considerable effort in promoting health and safety at home.

Appendix C Relating the Safety Culture framework with the Safety Culture dimensions proposed by James Reason

Early adopters of the concept of Safety Culture have often been using the Safety Culture model proposed by James Reason. Hence, they are accustomed to the Safety Culture components introduced by Reason in his model, and may even have conducted surveys that constitute a benchmark reference for their future safety culture assessments based on these components. For those organisations it may be useful to be able to relate the Reason components to the Characteristics of the Safety Culture framework described in this paper.

This Safety Culture framework is based on a synthesis of various studies in this field, and a number of these studies have in turn been partially based or inspired on the work of James Reason. Therefore, there are a number of similarities between the Reason components and the present Safety Culture Characteristics. In addition, the present framework consists of a number of Characteristics that are not – or not explicitly covered by the Reason components because they have more recently been identified as important elements of Safety Culture.

The table below shows how Reason's Safety Culture components relate to the Characteristics of the Safety Culture framework described in this paper.

		Safety Culture Framework					
		Commitment	Behaviour	Awareness	Adaptability	Information	Justness
Reason	Informed					X	
	Learning				X	X	
	Flexible				X		
	Just						X