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Studies on the state of the implementation of the provisions contained in ICAO Annex 14 on Aerodromes in the EASA Member States

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Studies on the state of the implementation of the provisions contained in ICAO Annex 14 on Aerodromes in the EASA Member States

Tender Specifications EASA.2009.NP.25 in conjunction with EASA.2008.OP.01

Horizontal Report (anonymised)

ICAO Annex 14 & Implementation in EASA Member States

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EXECUTIVE SUMMARY

Background:

Since the European Aviation Safety Agency (EASA) became operational in 2003 gradually more responsibilities have been handed over to it in order to assure a uniform level for aviation safety in the EASA Member States (EU-27 plus 4 associated countries). The latest major extension widened its responsibilities to aerodromes and air traffic management systems and air navigation services. As a result of its mandate the EASA will develop standardised, comprehensive and mandatory rules addressing aerodrome design, operations and equipment on the basis of Annex 14 on aerodrome design and operations of the International Civil Aviation Organisation (ICAO). This set of rules represents the standardised application of aerodrome-specific international standards contained in the said Annex; it must however also allow for sufficient flexibility to take into account of the physical constraints and operational specificities (size and type of operations) of the aerodromes in the community. But at the same time they must also be demanding enough to ensure that the level of safety at European aerodromes is maintained and improved. For this reason EASA decided in 2008 to launch the present study in order to understand the way in which the safety certification required by ICAO since 2003 has thus far been undertaken by the EASA Member States' authorities. At the same time it was aimed to get an understanding of the realities at a sample of European aerodromes.

The Purpose of the study:

Following a competitive tender procedure EASA commissioned in 2008 a consortium, made up of TÜV NORD Cert GmbH and the airsight GmbH, with the above study on the implementation status of ICAO Annex 14 in the EASA Member States. Within the scope of the study, the different national concepts for ICAO Annex 14 implementation, aerodrome certification and the implementation status of Safety Management Systems (SMS) in the EASA Member States had to be investigated. Besides that, also 56 selected aerodromes were visited in order to assess the level of conformity to ICAO Annex 14 requirements, the status of safety certification and SMS implementation. Within the first phase of the study 15 of the 31 EASA Member States were visited. These were: Germany, France, United Kingdom, Italy, Netherlands, Portugal, Czech Republic, Hungary, Sweden, Bulgaria, Denmark, Lithuania, Estonia, Cyprus and Switzerland. In the second phase of the study – contracted in late 2009 – the study was extended to cover the remaining 16 Member States. These states were: Austria, Belgium, Finland, Greece, Iceland, Ireland, Latvia, Liechtenstein, Malta, Norway, Poland, Romania, Slovakia, Slovenia and Spain. Only Luxembourg refused to take part in the study.

The whole study was carried out between the end of 2008 and September 2010. In that period, aviation authorities in 30 states were visited as well as a total of 56 aerodromes; interviews were carried out with assigned personnel of all of these organisations. Beforehand, data was collected from the different authorities and aerodromes via comprehensive online questionnaires to ensure an extensive preparation for the interviews. Afterwards individual yet streamlined monographs on each of the countries visited were compiled.

Besides that the Consortium was also requested to prepare a comparative horizontal report. In this horizontal report, the findings of the individual studies are summarized, clearly presented and evaluated in detail. The results from all states are considered primarily in terms of their horizontal comparability for the different national concepts and the implementation levels that were attained. Using this methodology, a horizontal gap analysis covering all EASA Member States has been performed, basically answering the question "Where do the authors see the main potential for improvement?"

In addition, different national concepts regarding the implementation of ICAO requirements, isolated national problems in specific areas and so-called "best practices" are illustrated and described in that report. The significance of such topics with respect to the forthcoming new common European aerodrome standards is explained when necessary. To allow for a more detailed insight, the summaries of the countries visited are also included at the end of the document. Further findings, with greater attention given to the particularities of each examined country are provided in the 30 individual monographs. This information is available in addition to this horizontal report.

The consortium would like to thank all Civil Aviation Authorities and aerodromes that participated in the exercise for their time, openness and efforts in completing the online questionnaire. The exercise has yielded valuable information as to the future challenges for the European harmonisation of rulemaking for aerodrome safety. It is not the intent of this report to criticise or blame either authorities or aerodromes. This report is strictly aiming at the detection of good practices on the one hand and areas for improvement on the other hand. It also helps to grasp the challenges facing EASA during the future rule-making process and the joint implementation of such common rules thereafter. The report will be helpful to understand specific coun-

tries' state of play so that the joint work on a common system can take account of these differences and provide adequate transition and implementation measures.

State of play transposition of the Annex 14:

In summary, one can safely say that the current situation concerning the legal framework for the transposition of the ICAO Annex 14 requirements in the EASA Member States and at aerodromes presents itself as very heterogeneous. Although all national aviation authorities, and all the large aerodromes, work in principle on the basis of ICAO Annex 14 Standards and Recommended Practices (SARPs), there are nevertheless some strong differences in the individual national approaches. Therefore it is very challenging to make summarised observations, especially evaluations regarding the potential impact of the future EASA rules. The individual Member States and the situation at aerodromes must be viewed individually and be comprehensively assessed.

The national implementation concepts already differ very widely with respect to the implementation of ICAO Annex 14. Some individual states have declared ICAO Annex 14 as fully binding in their countries, others have integrated it into various different national rules each having differing legal characteristics; yet other states have implemented it into a single national regulation combined with all of the other 17 ICAO Annexes; while again others have not yet transferred ICAO Annex 14 into national aviation law at all. In addition, states often have very different understandings of the validity of ICAO Standards vs. Recommended Practices. Some only implement Standards, others have also declared the Recommendations as mandatory, yet other states have even tougher national requirements than ICAO in certain subject areas.

Consequently the level of consistency of the currently valid ICAO Annex 14 with national regulations is also extremely varied. Vastly different levels were observed, from a 100% correlation to considerable differences in some instances, particularly because of massive rulemaking delays on a national level. Two issues play a considerable role in this:

The first issue pertains to the type of national legal implementation. In instances where individual countries take the approach that the implementation of ICAO Annex 14 must take effect (exclusively) under the auspices of a parliamentary act, the proceedings become per se very complicated, tedious, and to a large extent, politically motivated. Political changes and elections can have effects on ongoing rulemaking processes. By contrast, if implementation has been fully assigned to a sufficiently empowered aviation authority (CAA) that is able to issue subordinate legislation to update the national rules to the changes of the Annex 14, it is possible for the national implementation to occur very promptly.

The second issue that could lead to problems with the timely and comprehensive implementation of the specifications contained in Annex 14 is the limited capacity of the authorities. In almost all states, the authorities deal with sometimes challenging shortages of staff. If for such resource reasons the authority concerned is only with difficulty able to get the relevant preparations and blueprints for national regulations underway, the implementation of updates on the national level will in turn be delayed.

Especially the new EU Member States had to cope with particularly high challenges. After establishing entire new administrative and constitutional legal structures after their recent independence, they also had to cope with the comprehensive legal and administrative changes in preparation for accession to the EU. To some extent these huge challenges continue to have an effect to this day; however from an overall perspective these countries have established some very comprehensive standards.

Very often also the involvement of the state in the direct service provision of aviation services played a significant role for the quality and comparability of the national legal framework. Where the state was operator of all or the majority of the national aerodromes and maybe at the same time also the national Air Navigation Service Provider (ANSP), the legal framework mostly was insufficient. Missing separation from aerodrome operation and a of lack independency of certification and oversight bodies did lead to less developed rules.

State of play implementation of the certification requirement:

The situation with regard to the certification of aerodromes is very similar. On the one hand, some of the aerodrome certification (licensing) procedures encountered had already been established decades ago. Although these did not utilize the ICAO's term of "certification" in every instance, in essence they almost completely fulfilled the requirements of the "ICAO Certification" concept. In some of these countries the existing regulations were simply adapted to the additional official ICAO guidelines and contents needed, and other than that continued to be implemented as they already had been for a long time.

In other countries, creating applicable and appropriate legal fundaments and implementing aerodrome certification was unsuccessful. Here the spectrum of reasons, some of them understandable, was also quite varied: Sometimes basic legal and constitutional provisions were subject to considerable changes, which then effectively did not permit relevant legislation processes at all. Elsewhere, the legislative demands made on the introduction of the regulations were connected to high (political-legislative) hurdles, that the introduction of certification would not be possible for several years because of changes in the political landscape. Very often the late introduction of aerodrome certification was connected to an insufficient or late separation of operation and oversight. The existing authorities either were not fully legally empowered, not used to the challenges of a complex certification process, or not capable for staffing issues. In one case external support had to be hired to a large extent just to get things started.

Major national "multi-aerodrome" operator also played a role for the timely implementation of aerodrome certification. Whilst the advantages of a centralized large and capable organisation sometimes supported such processes other situations could be observed where the powers of such operators (staffing, competency, political influence etc.) have not really been used to support the implementation of certification in the state. The adoption of exemptions from actual standards has been advocated heavily, timelines were orchestrated by the operator and basic authorities' project plans were prepared by the operator.

Beside all that it also occurred that states just addressed major aerodromes for a mandatory certification whilst the rest remained with almost no attention or at least limited attention and much "lighter" rules. The limited capacities of the national authorities again played an important role here.

All in all, concerning the certification-related subjects, it can be asserted that from the expected new European rules for the certification of aerodromes within the countries visited, varying regulatory impacts can be expected. In some countries the new demands will impact largely on aviation authorities and aerodromes, in others almost no one will be affected at all. Above all the alignment of the aerodrome certification with existing national licensing and spatial planning procedures might play a role for the states; besides that the number of airports a state authority has to deal with will have quite some impact.

State of play implementation of the SMS requirement:

The area of Safety Management System (SMS) in its entire scope undoubtedly represents the largest content-related challenge for both aerodromes and the authorities.

On the one hand, the essential and procedural components and concepts for an aerodrome SMS have not yet definitively been outlined even at the level of ICAO. Because of the significance of this subject, the introduction of a new self-contained, stand alone ICAO SMS Annex is being envisaged. The authors in this assessment have therefore established two quality levels on the subject matter: The first level is based on the basic fundamental SMS standards, as they are currently outlined by the ICAO for the area of SMS. The second level takes into account up-to-date and mature SMS standards, processes and components, which would be expected in a truly comprehensively and effectively operating Aerodrome SMS.

In summary it can be said, that only in very few countries had a level been achieved that can be described as highly developed and successfully implemented. In the horizontal analyses, undertaken in this report, the gap between the current situation and the "best practice" is also very apparent. Not unexpected, states with very challenging terrain and weather conditions had developed very interesting approaches in that area, driven by the urgent need to manage a large number of unavoidable deviations from actual standards.

Some other countries still have a long way to go; particularly even concerning the legal bases and necessary national standards for SMS. In these countries the aerodromes have outperformed the aviation authorities to some extent, by undertaking the first steps of SMS implementation even without a legal framework issued by the authorities. Even in countries with existing basic legal standards, the larger aerodromes especially have to some extent made greater progress in single areas than the authorities demanded thanks to their international network.

In other countries, basic standards and requirements are at least officially met, but the actual application and real operation of the SMS does not yet exist. The range of different levels of compliance is large. Even the national opinions of certain peculiarities and components of an aerodrome SMS (reporting, internal audits, risk management, accountabilities) in respect to necessity and importance varies widely.

Here it should also be remembered that (also) in terms of SMS, a really sustained requirement, promotion and monitoring of the aerodromes by the aviation authorities exists in only a few countries. Beside the lack of staff, the authorities often have to deal with a large number of new requirements which require sometimes highly sophisticated knowledge and training. However,

such training is only available to a limited extend as there are also not too many specialists available. This availability is further limited due to the gap in earnings between industry and public service.

Beside that another interesting situation has to be kept in mind for the actual situation: aerodromes do very often have shared roles – aerodrome operator, ANSP and ground handler. Right now quite different models of SMS are present and required for the different service provisions. Where requirements for SMS are defined, they should ensure that an organisation providing aerodrome operations and air navigation services does not have to fulfil two different sets of SMS requirements. One organisation should have one SMS.

Therefore the future EASA rules on aerodrome SMS, which because of the considerable importance of the topic need to be very detailed and advanced, will almost certainly have considerable impacts on the countries of the community which should not be neglected. Such impact will affect both authorities and airports, it only can be absorbed by clear qualification criteria for all personnel involved accompanied by comprehensive training efforts. The new rules so will have to take into account a wide variety of already existing basics. For instance, the specifications also have to acknowledge the fact that more and more integrated management systems are implemented at aerodromes. The specifications should allow for such solutions. The specifications should also take into account special solutions (or flexibility) for aerodrome operators which operate sometime a large number of different airports. It could for instance be observed that some of those operators do have a centralized SMS concept where some staff is used at different locations – meaning airports have a "shared" SMS-manager.

State of play capacity of the national competent authorities for aerodromes:

The following can be stated in general in respect to the national authorities:

Overall, the personnel resources of the authorities tend to be, in most cases, scarce to inadequate. Authorities in the countries where ICAO Annex 14 can be directly applied, and who consequently have nothing or only a limited amount to do with legal implementation procedures, can focus more intensively on the implementation of the individual guidelines and the oversight of the aerodromes. In this respect the future Europe-wide standardised regulations actually may lead to improvements.

But such improvements are not likely to come to fruition, since a complete relief of the national authorities from all rulemaking will not take place. Rulemaking for small aerodromes (outside of EASA scope) will stay with the Member States. For these aerodromes they will also have the normal national implementation, certification and monitoring measures to carry out. Additionally the authorities will certainly have some new and very special challenges to deal with in the implementation of the new European aerodrome regulations, and probably also more intensive certification and oversight activities to carry out.

In this respect one can almost speak of a double-load for the future. In order to compensate for this disadvantage, the future European rules must be qualitatively good and clearly and comprehensively structured in order to provide support to the work of the national authorities through e.g. good guidance material.

It also cannot be expected that the staffing situation at the national authorities will improve in the future. The consequences of the shift of national responsibilities to EASA will very likely be an accelerated cutback or non-replacement, of staffing levels, since they suggest a lower workload at the national authorities.

In view of this situation, clear and working concepts to externally compensate personnel shortages, if applicable, must be included. This is especially important taking into account the significance of surveillance activities for operational safety in all areas of aviation. Especially the concept of using accredited and independent neutral companies for the support of authorities seems to be interesting – for the one hand it still leaves control in the hand of the authorities (on qualification, accreditation, task execution etc.) and for the other hand it has already been successfully used at European level (certification of ANSP based on European SES package).

Conclusions:

In conclusion it can be stated that:

1. The differences in the individual countries visited, both in the area of national legal implementation concepts of Annex 14 in questions of consistency with Annex 14, are to some extent considerable. The new legal framework must not only deal with that situation, it also has to fill gaps visible in the existing framework and has to be based on a flexible approach to aerodrome certification. This is necessary for the existing deviations which can be overcome in certain timelines but also for the unavoidable deviation due to special terrain and weather conditions.

2. Taking into account the wide variety of deviations at aerodromes and their potential impact on operational safety, clear standards for the management and especially the assessment of such deviations are essential.
3. Also the national certification (licensing) procedures vary considerably and to some extent do not even exist. National authorities are sometimes not fully prepared for the tasks at hand, either because of their insufficient empowerment and staffing, or because of their own (or even still missing) separation from operational responsibilities in the recent past.
4. The national concepts on the topic of SMS are also very heterogeneous and, in particular, the degree of actual implementation and utilization of SMS must definitely be called unsatisfactory in some cases. In conclusion it can be summarized that there is a considerable need for clear, detailed and proportionate specifications regarding SMS aerodrome standards. This will most likely result in a high impact on authorities and airports when new and sufficient European standards will come into effect.
    a. Within that set of rules the special need for common requirements for all stakeholders involved has to be satisfied. Aerodromes now do very often different activities – aerodrome operator, ANSP, ground handler. Also in general "third parties" have to be integrated into the risk management at airports.
    b. Beside that the rules also have to acknowledge the fact that more and more integrated management systems are implemented at aerodromes. The specifications should allow or even encourage for such solutions. The rules also should take into account special solutions (or flexibility) for aerodrome operators which operate sometimes a large number of different airports.
5. Above all, the national authorities in all Member States deal with a severe shortage of staff and sometime expertise. That problem can however not simply be resolved with just new legal rules and enforcement, since capabilities of the authorities are unlikely to improve. The future legal framework has to include options and solutions for the foreseeable shortage of staff at national authorities' level.

Therefore noticeable consequences from the new European regulations can be expected for the visited countries, their authorities and the aerodromes located in these states. By having analyzed the system in 30 Member States an important step has been taken to identify the gap between the current heterogeneous situation and the envisaged future common level of safety standards in all EASA Member States. The required Regulatory Impact Assessment (RIA), shall built on this work when required.

GENERAL INTRODUCTION

The consortium made up of TÜV NORD Aviation (Berlin), a branch of the TÜV NORD CERT GmbH, and the airsight GmbH (Berlin) was mandated in 2008 by EASA to prepare a study on how ICAO Annex 14 has been transposed into the national legal structure of the EASA Member States, how certification of aerodromes is undertaken in these countries and what kind of standards have been implemented concerning Safety Management Systems (SMS) at aerodromes. In total 30 national aviation authorities and 56 airports were visited during the course of the study. Thanks to the wide and impressive support from almost all EASA Member States a very comprehensive study could be done. Only one state – Luxembourg – felt unable to take part in the study.

Background is the Single European Sky Package II, which contains, amongst other elements, the amending Regulation 1108/2009 to the EASA Basic Regulation 216/2008, and which extends EASA´s rulemaking and standardisation responsibilities to the area of safety of aerodromes. Because the future EASA rules would replace national legislation on aerodrome safety, EASA needed to obtain specific information about the current situation in the EASA Member States.

For this purpose, the consortium was commissioned to conduct interviews with representatives of the civil aviation authorities and also visit and interview some selected airports in the states involved. Before having done so, the consortium has prepared itself with publicly available information on the implementation of Annex 14. Under the contract, the focus was to make an inventory of aerodrome related data, the legal framework, the certification process (including the procedures used today to handle known deviations from ICAO standards), and SMS implementation.

The data and information is collected in the present report. Given the character of their mandate, the consultants usually relied on their own knowledge and assessment; however, they were very often dependent on the reliability of the information given to them by the persons assigned to be interviewed. To show the difference, the phrases "stated by the interviewees" vs. "opinions by the authors" are used whenever necessary.

I DETAILED HORIZONTAL PRESENTATION OF RESULTS

1 HORIZONTAL APPROACH USING MATRICES

The first section of this report summarizes the current situation and special national characteristics of all countries visited in individual matrixes. These summaries follow the structure of the individual countries' monographs and give the reader a quick overview of all the individual countries visited in the study. Thus, one can see – without having to go into details - which approach a given country has taken to implement the ICAO standards, to what extent national airport standards conform to Annex 14 and which aerodromes in a given country are subject to certification.

This is meant to allow for a first quick comparison that also provides information as to how different various areas are regulated for Europe's aerodromes. A total of 25 matrixes delineate the relevant individual subjects and already allow for very detailed insights into some of them.

An immediate insight can be gained from the choice of colour coding of the individual cell for each country and each subject being assessed. This colour coding reflects the authors' opinions as to the suitability of national regulations or the current status of implementation of individual ICAO standards, for example. This allows one to clearly see in which areas and for what reasons further improvements are necessary and where satisfactory or ideal procedures and/ or standards have already been established. It is therefore possible, for instance, to quickly find out whether certain necessary implementation measures have already been completed in all countries (everything green) or whether particular national characteristics have led to specific solutions in some countries (e. g. yellow or red colours).

The colour coding concept follows established and accepted criteria. It progresses from dark green, representing the opinion "best practice", to dark orange, representing the opinion "strong improvement necessary". All the codes, and the underlying opinions, are shown below:

Opinion	Representing Colour
Best practice	
Sufficient standard	
Partly sufficient	
Improvement necessary	
Strong improvement necessary	

Figure 1: colour code for reference tables

On the basis of this information a decision can then be made as to whether there is a need to obtain further information from certain countries which can then be gathered by reading the relevant sections of the respective monographs.

To allow for a condensed overview of the respective areas the individual matrixes are summarized for the important structural and operational areas:

1. Legal Framework and Authorities
2. Certification of Aerodromes
3. Safety Management Systems
4. Technical Assessment of Aerodromes

Based on these matrixes the critical points in these four areas then become quite apparent. They show where there is a need for improvement within the authorities or at the aerodromes, what topics cause problems for the operation or supervision of aerodromes due to constitutional or other difficulties or if the current system shows general flaws.

These aggregated results in the matrices are then explained in detail and evaluated before first conclusions are drawn.

These results also form the basis for suggestions, already included where appropriate, concerning necessary legal regulations and standards in the new regulatory framework to be worked out for Europe's aerodromes. The results are displayed either as "best

practices" to be used as examples for the development of the new European framework or as identified "open issues" to draw attention to problematic areas within the aerodrome environment in Europe. Further suggestions are made as so called "rule-making needs" and contain examples of where special rules might be useful for improving operational safety at aerodromes.

2 MATRICES

Quick Reference Table (detailed information is given in the corresponding chapters)

AREAS	Chapter	Country																																			SK
Legal Framework and Authorities																																					
Adoption of ICAO Annex 14 Into the National Legal Framework	2.1.1																																				
Comparability of the National Legal Framework to the ICAO Annex 14	2.1.2																																				
Capabilities of Aviation Authorities	2.1.3																																				
Handling of Differences Between the National Legal Framework and the ICAO Annex 14	2.1.4																																				
Awareness of the CAA of Deviations from Regulations at Aerodromes	2.1.5																																				
Handling of Aerodromes' Deviations from Regulations	2.1.6																																				
Certification of Aerodromes																																					
Legal Framework for Certification	2.2.1																																				
Applicability	2.2.2																																				
Implementation Status of ICAO Certification	2.2.3																																				
Fees for Certification	2.2.4																																				
Safety Management Systems, Part CAA																																					
Legal Framework for SMS	2.3.1.1																																				
Applicability of SMS Requirements According to the Standards of the CAA	2.3.1.2																																				
Scope and Structure	2.3.1.3																																				
Implementation Status	2.3.1.4																					-															
Third Party Involvement	2.3.1.5																					-															
Safety Management Systems, Part Aerodrome																																					
Scope and Structure	2.3.2.1																					-															
Implementation Status	2.3.2.2																					-															

Quick Reference Table (detailed information is given in the corresponding chapters)

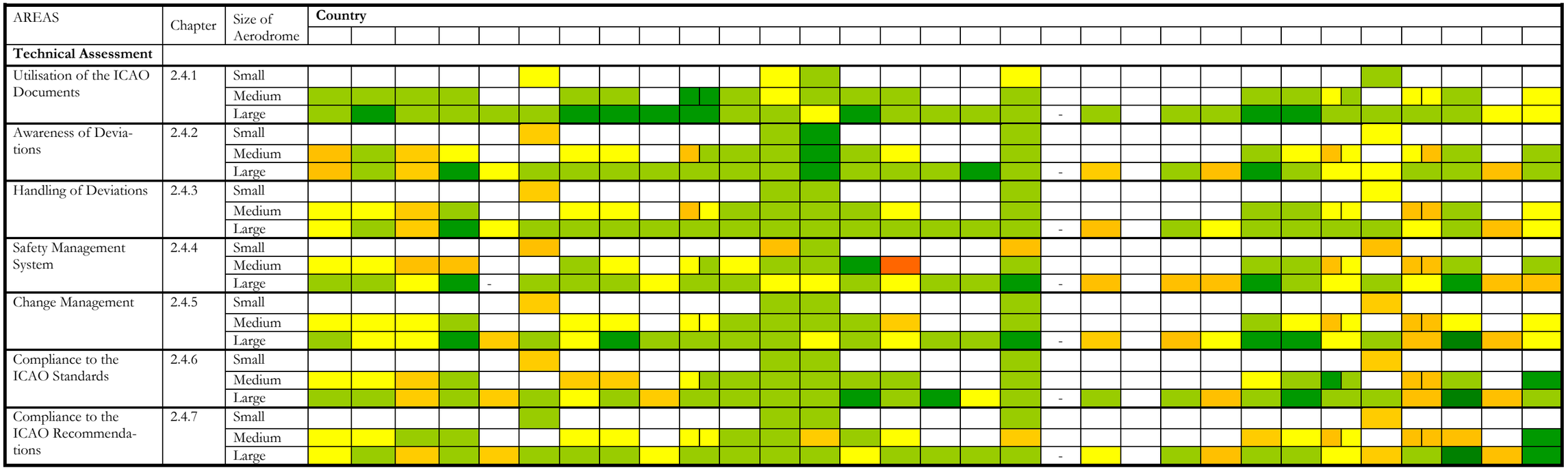


Figure 2: Quick Reference Table

2.1 LEGAL FRAMEWORK AND AUTHORITIES

2.1.1 ADOPTION OF ICAO ANNEX 14 INTO THE NATIONAL LEGAL FRAMEWORK

	B	A	C	A	D	C	B	A[1]	B	C	B	B	B	C	C	E	C	C	A	B		C	A	B	B	B	A	B	B	B	C

- Within this area the different solutions on how to implement Annex 14 into the national legal framework are shown and assessed
- A to D represent the different implementation concepts, the colours represent the assessment of the authors
- All concepts are considered as a sufficient solution because the enable an implementation in general
- The concept of dynamic referencing is considered as best practise due to the fact that it prevents unnecessary rulemaking burdens for the CAAs
- The colours represent the assessment of the authors

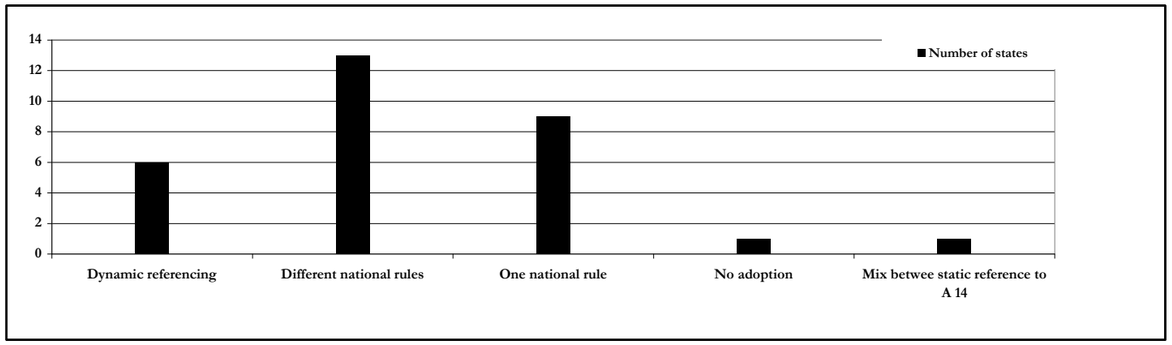
Stated by the interviewees

A Yes, dynamic referencing to the ICAO Annex 14
B Yes, adoption in various different national rules
C Yes, adoption in one national rule
D No, adoption in the national legal framework
E Mix between static reference to A 14 and **adoption in another single rule**

Opinions by the authors

Best practice
Sufficient solution
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

Figure 3: Matrix "Adoption of ICAO Annex 14 into the National Legal Framework"

[1] Categorisation only focuses on IMC aerodromes. For VMC aerodromes another national rule has been implemented.

2.1.2 COMPARABILITY OF THE NATIONAL LEGAL FRAMEWORK WITH ICAO ANNEX 14

E	A	E	A	F	E	C	A	C	B	B	E	C	B	C	A	D	C	A	C		D	A	C	C	E	A	B	B	E	E

- Within this area the level of comparability between Annex 14 and the national legal framework is described
- Indirectly, it also gives an indication why aerodromes' characteristics might differ to Annex 14 (due to non-compliant legal standards)
- A to D represent the different level of comparability, mainly taking into account timely delays due to complex rule making processes or insufficient capabilities in the rulemaking authorities
- The colours represent the assessment of the authors

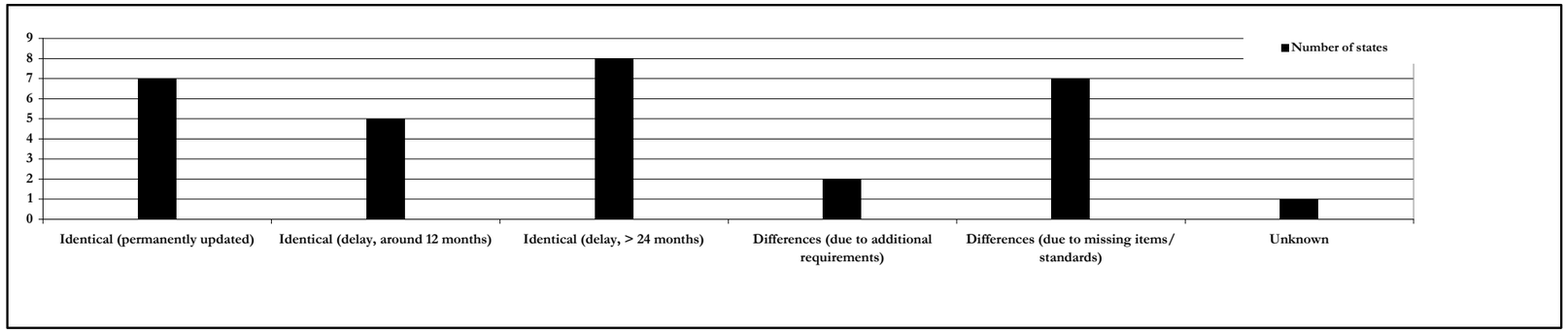
Stated by the interviewees

A Identical and permanently updated
B Identical but with a delay around 12 months
C Identical but with a delay over 24 months
D Differences due to additional requirements
E Differences due to missing items and standards
F Unknown/ uncertainty

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

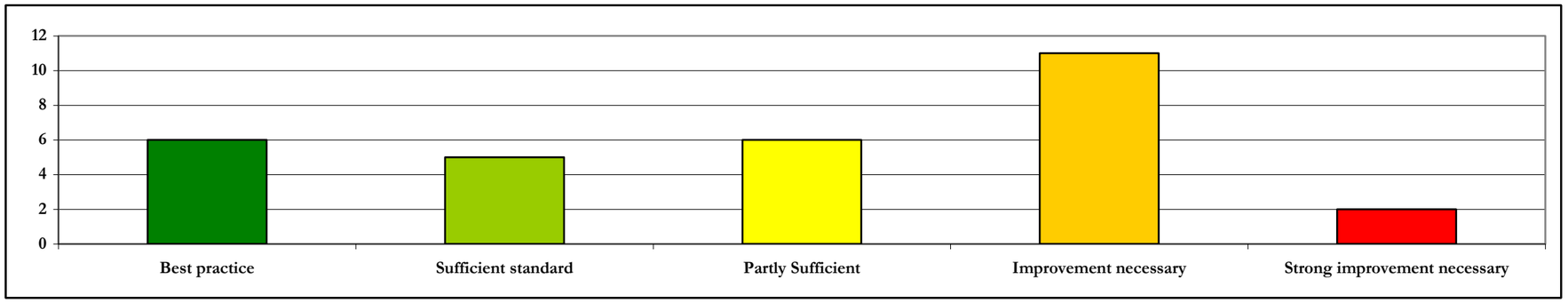


Figure 4: Matrix "Comparability of the National Legal Framework with ICAO Annex 14"

2.1.3 CAPABILITIES OF AVIATION AUTHORITIES

C	C	B	C	D	B	B	C	B	C	C	A	A	B	B	A	C	A	A	B		B	C	B	C	C	B	B	A	C	C

- Within this area the capabilities of the authorities are shown, taking into account mainly staffing problems but also reflecting proficiency/ expertise gaps
- A to D represent the different level of capabilities
- The colours represent the assessment of the authors

Stated by the interviewees

A Sufficient staffing & proficiency
B Additional staff & proficiency necessary
C Additional staff necessary
D Additional proficiency necessary

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees

Opinions by the authors

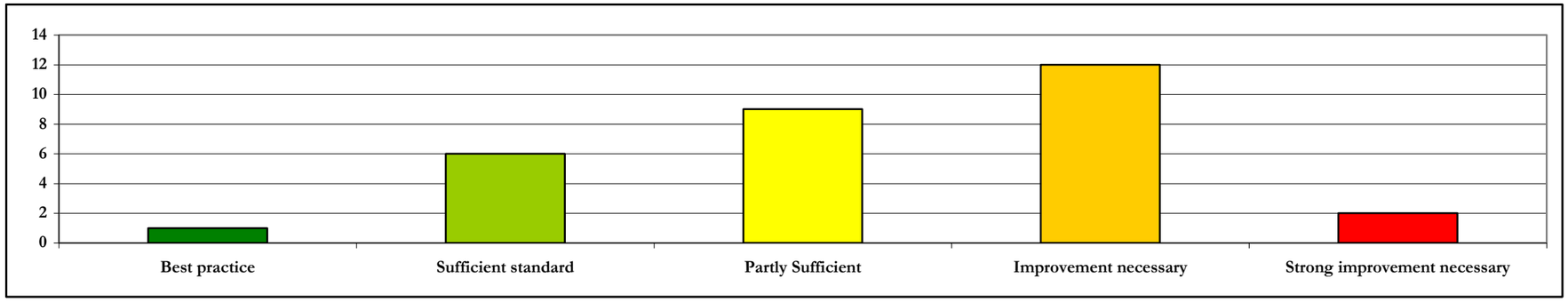


Figure 5: Matrix "Capabilities of Aviation Authorities"

2.1.4 HANDLING OF DIFFERENCES BETWEEN THE NATIONAL LEGAL FRAMEWORK AND ICAO ANNEX 14

D	A	C	B	D	C	C	B	C	B	A	C	B	C	D	C	A	A	A	C		C	A	D	C	D	A	D	A	D	C

- Within this area the national approach to the handling of differences between Annex 14 and the national legal framework are shown and assessed
- A to D represent the current national situation
- The colours represent the assessment of the authors

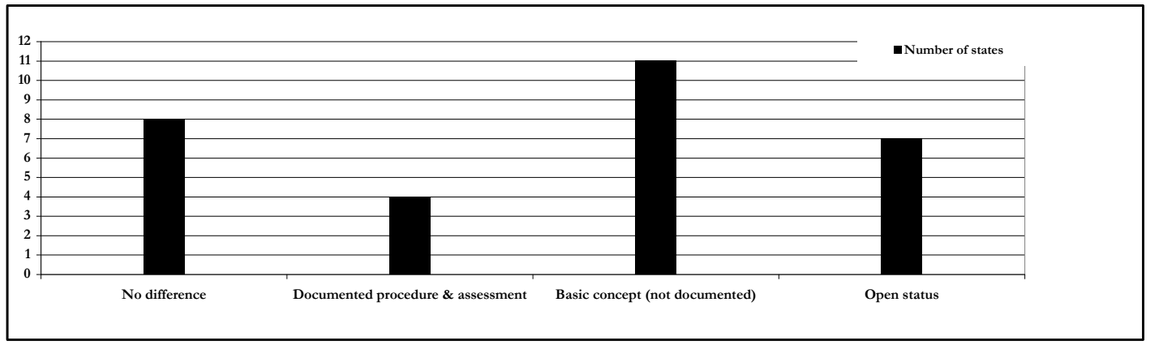
Stated by the interviewees

A No differences exist
B Documented procedure and assessment of differences
C Basic concept only (e. g. not documented, no knowledge about details or reason)
D Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

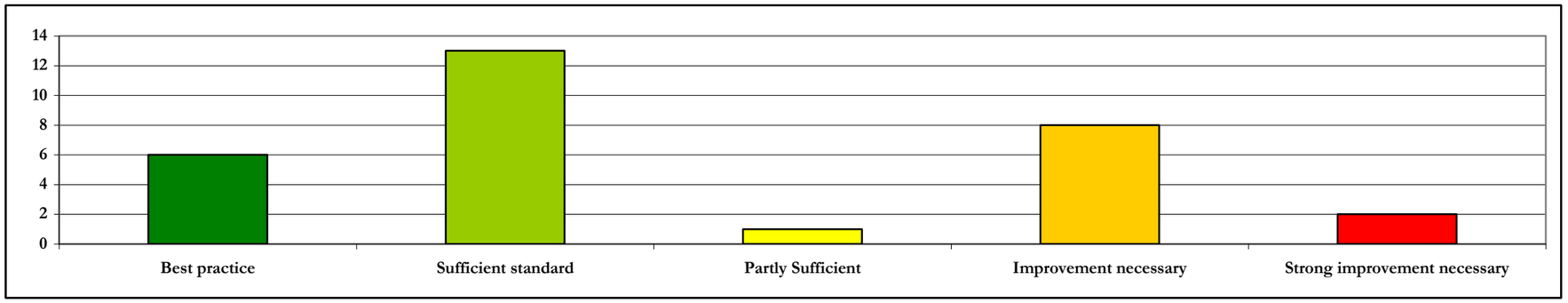


Figure 6: Matrix "Handling of Differences between the National Legal Framework and the ICAO Annex 14"

2.1.5 AWARENESS OF THE CAA OF DEVIATIONS FROM NATIONAL REGULATIONS AT AERODROMES

	C	A	C	A	C	C	C	D	D	B	C	B	A	C	C	D	A	A	D	C		D	B	C	B	C	C	D	A	C	B

- Within this area the level of awareness of the authorities regarding deviations at the aerodromes is shown and assessed
- A to D represent the levels and concepts to assure awareness, the colours represent the assessment of the authors
- D represents a national characteristic, which provides a sufficient solution as well e. g. the request for a yearly external assessments of aerodromes' infrastructure, signed by the operators, delivered to the authority
- The colours represent the assessment of the authors

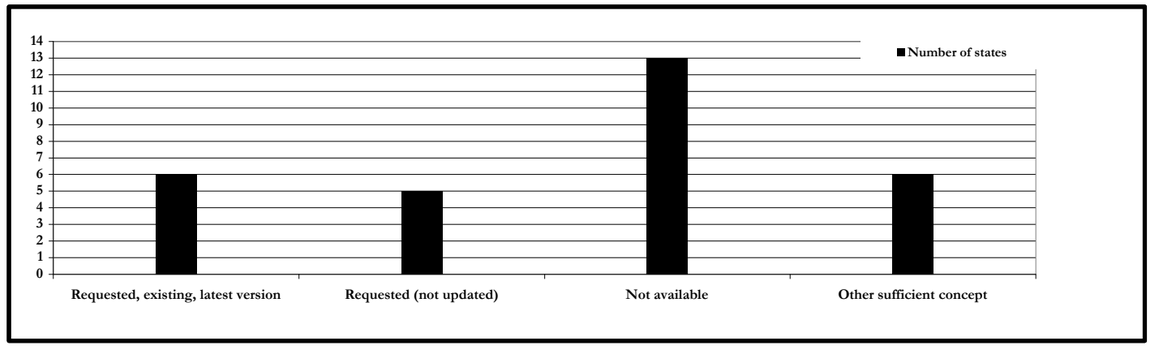
Stated by the interviewees

A Requested compliance lists, existing compliance lists and latest version available
B Requested compliance lists but not up to date
C No compliance lists available
D No compliance lists but other sufficient concept

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees[2]



Opinions by the authors

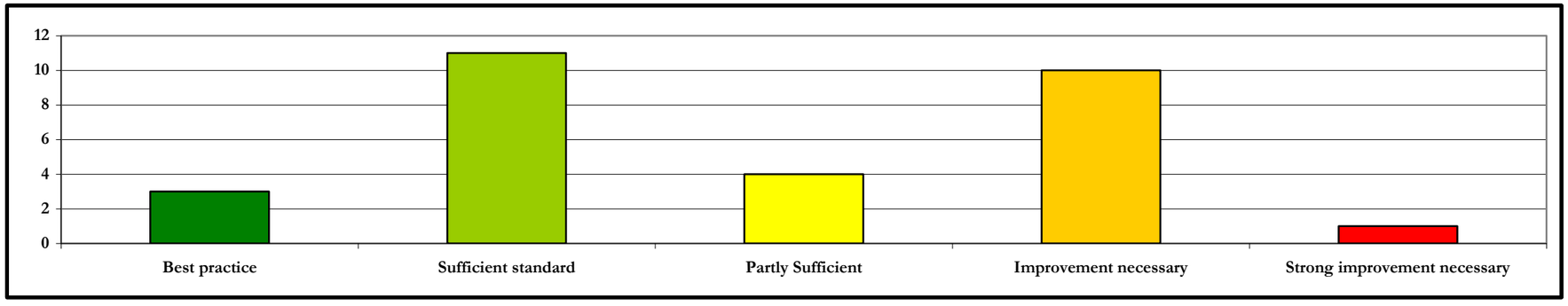


Figure 7: Matrix "Awareness of the CAA of Deviations from Regulations at Aerodromes"

[2] That column explains the answer of the interview partner regarding the existing concepts of national solutions with regard to the topic of the main matrix. The answers refer to the levels and concepts to assure awareness, in that case A to D.

2.1.6 HANDLING OF AERODROMES' DEVIATIONS FROM REGULATIONS

A	B	C	B	D	C	B	A	A	D	B	A	A	D	C	C	D	A	B	C		C	B	D	B	D	D	C	A	C	C

- Within this area the authorities' approach to the handling of deviations at the aerodromes to Annex 14 and/or the national legal framework is shown and assessed
- A to D represent the different concepts
- The colours represent the assessment of the authors

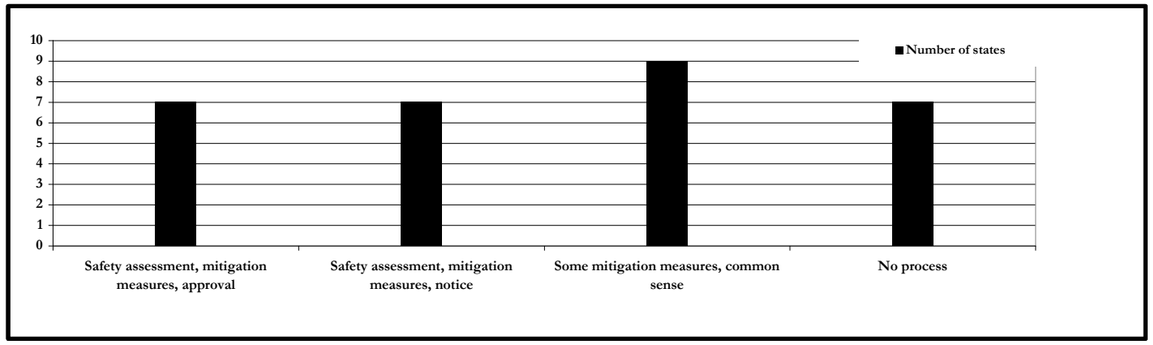
Stated by the interviewees

A Safety assessment, mitigation measures & formal approval
B Safety assessment, mitigation measures & notice
C Some mitigation measures only, based on common sense (opinions)
D No process established

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

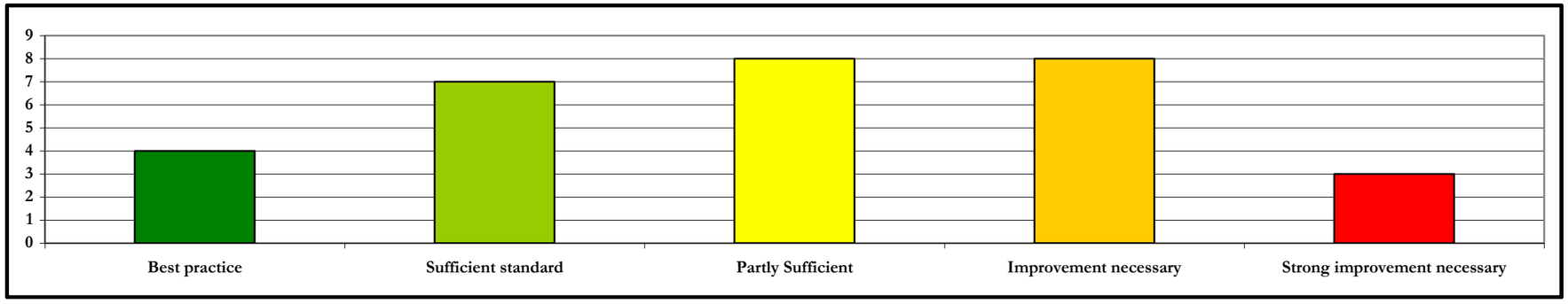


Figure 8: Matrix "Handling of Aerodromes' Deviations from Regulations"

2.2 CERTIFICATION OF AERODROMES

2.2.1 LEGAL FRAMEWORK FOR CERTIFICATION

	C	A	A	A	D	A	A	A	A	A	A	A	A	D	B	A	A	B	A	A		A	A	D	A	B	A	A	A	B	B

- Within this area the existence of sufficient national legal framework for aerodrome certification is described and assessed
- A to D represent the actual situation
- The colours represent the assessment of the authors

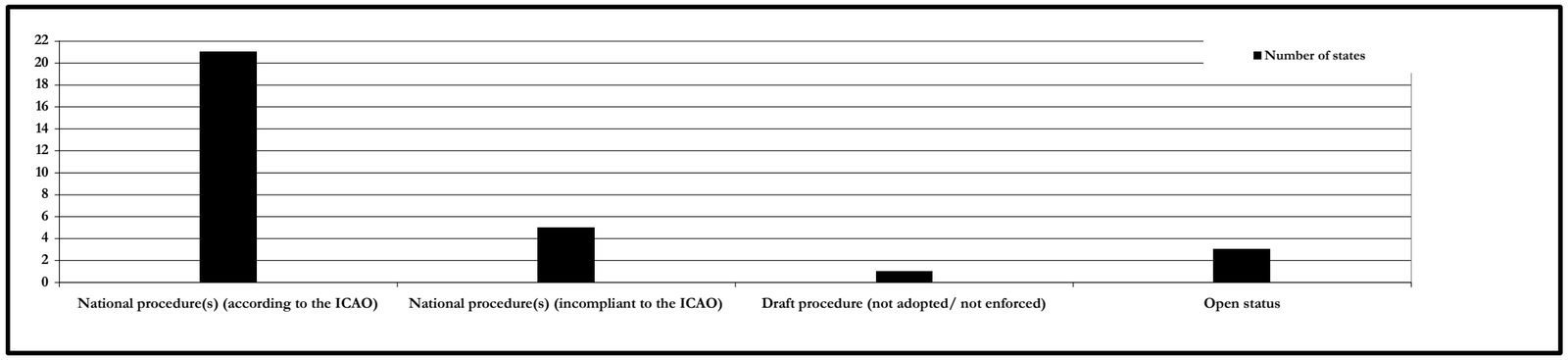
Stated by the interviewees

A National procedure(s) exist which are in line with the ICAO requirements
B National procedure(s) exist which are incompliant to the ICAO requirements
C Draft procedure (not adopted/ not enforced)
D Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

Figure 9: Matrix "Legal Framework for Certification"

2.2.2 APPLICABILITY OF THE CERTIFICATION REQUIREMENT TO THE CATEGORY OF AERODROMES

A	A	A	C	A	A	D	C	C	C	D	B	D	E	E	D	D	B	C	D		A	D	E	A	A	D	D	C	D	D

- Within this area the scope of aerodromes requested to be certified is shown and assessed
- It also shows how this compares to the required ICAO certification scope[3]
- A to D represent the different scopes
- The colours represent the assessment of the authors

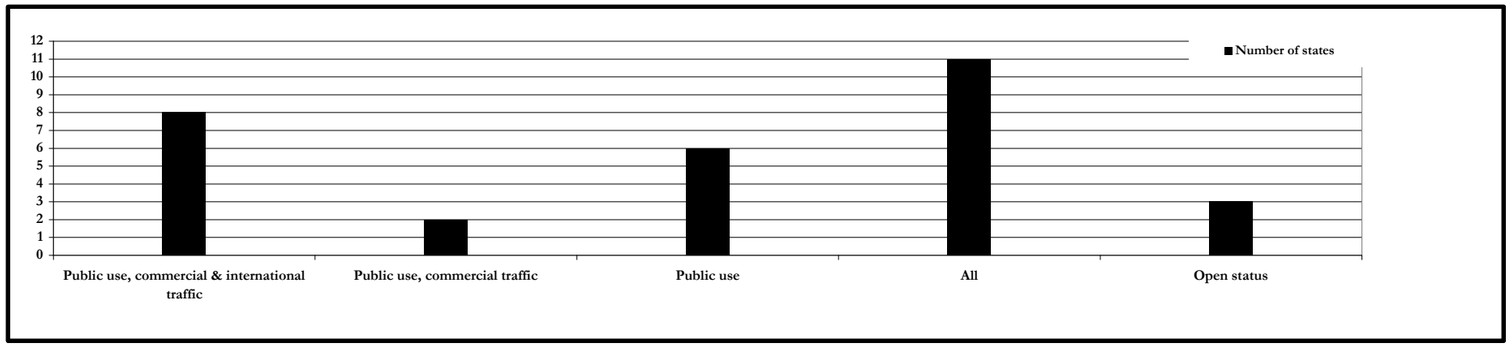
Stated by the interviewees

A Public use, commercial & international traffic
B Public use, commercial traffic
C Public use
D All
E Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

Figure 10: Matrix "Applicability"

[3] ICAO Standard: all international aerodromes, ICAO recommended Practices: all public aerodromes.

2.2.3 IMPLEMENTATION STATUS OF ICAO CERTIFICATION

	C	B	A	B	D	B	A	A	A	D	B	B	A	D	D	A	A	B	D	A		A	A	D	A	C	D	A	A	D	A

- Within this area the implementation status of the national aerodrome certification programme is described
- A to D represent the different degree of implementation
- The colours represent the assessment of the authors

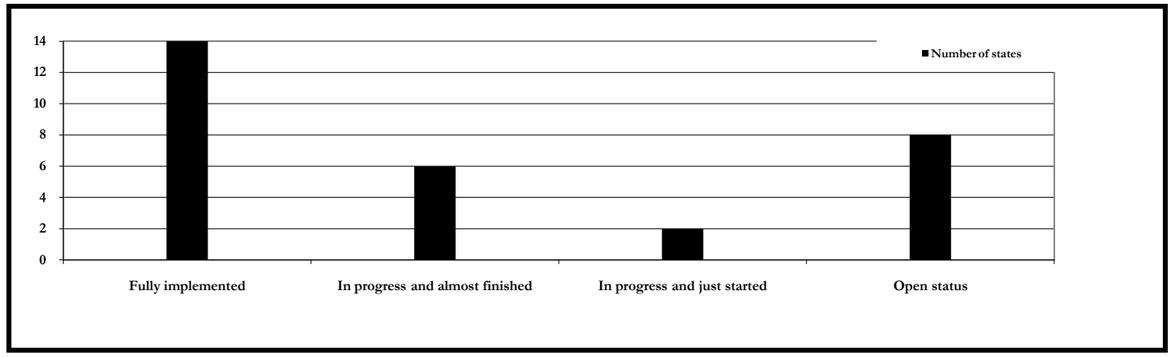
Stated by the interviewees

A Fully implemented
B In progress and almost finished
C In progress and just started
D Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

Figure 11: Matrix "Implementation Status of ICAO Certification"

2.2.4 FEES FOR CERTIFICATION

	B	B	C	B	F	C	C	A	C	E	C	D	C	F	C	C	A	A	B	B		C	C	C	C	C	A	A	A	C	C

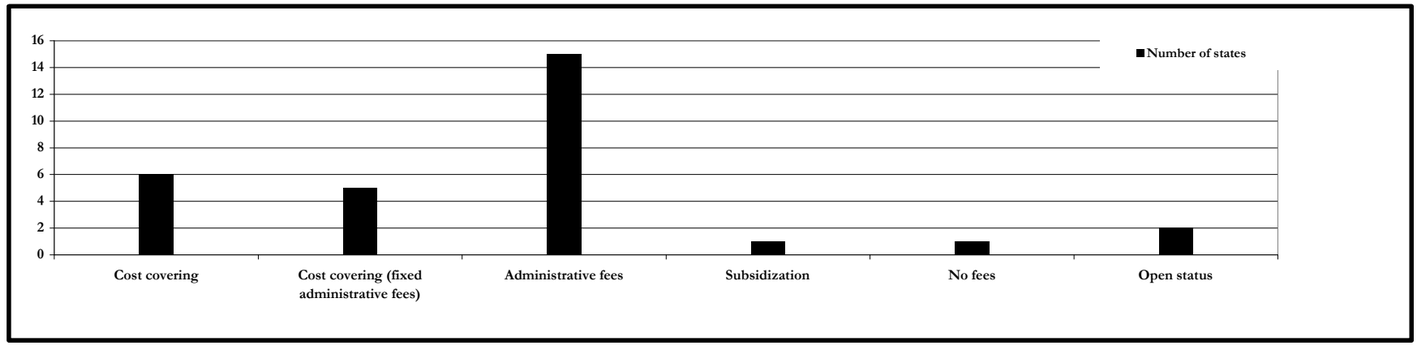
- Within this area the different national concepts for the fee schemes for certification are described
- A to D represent the different fee concepts
- The colours represent the assessment of the authors

Stated by the interviewees

A Real cost covering
B Cost covering approach but fixed administrative fees
C Administrative fees
D Subsidization (Higher fees for major aerodromes in order to have smaller fees for smaller aerodromes)
E No fees
F Open status

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

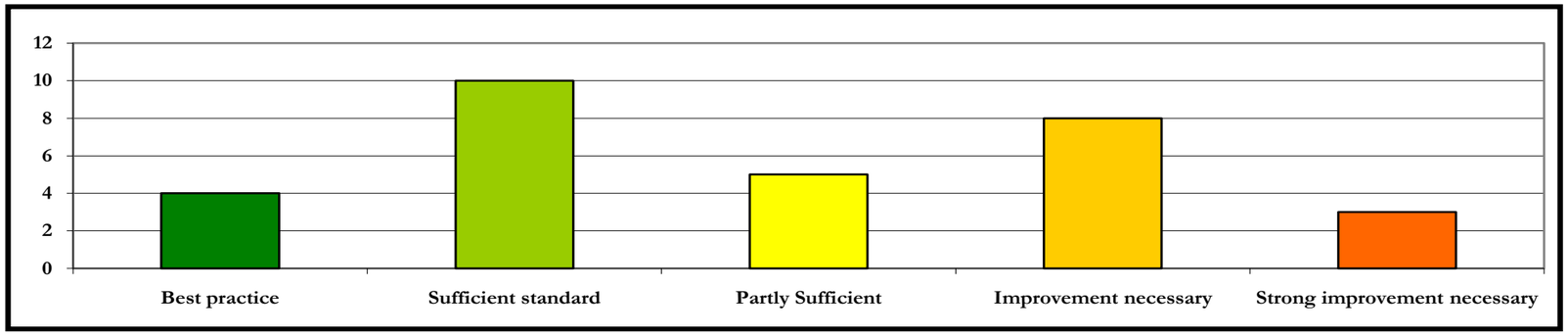


Figure 12: Matrix "Fess for Certification"

2.3 SAFETY MANAGEMENT SYSTEMS

2.3.1 PART "CAA"

2.3.1.1 LEGAL FRAMEWORK FOR SMS (CAA)

	C	A	B	A	C	B	B	A	B	B	A	B	A	B	D	B	A	A	A	B		A	B	D	A	C	D	A	A	D	B

- Within this area the existence of a sufficient national legal framework for aerodrome SMS is described and assessed
- A to D represent the status quo
- State of the art solutions of aerodrome SMS are considered as best practise, the basic ICAO requirements are considered as sufficient standard
- The colours represent the assessment of the authors

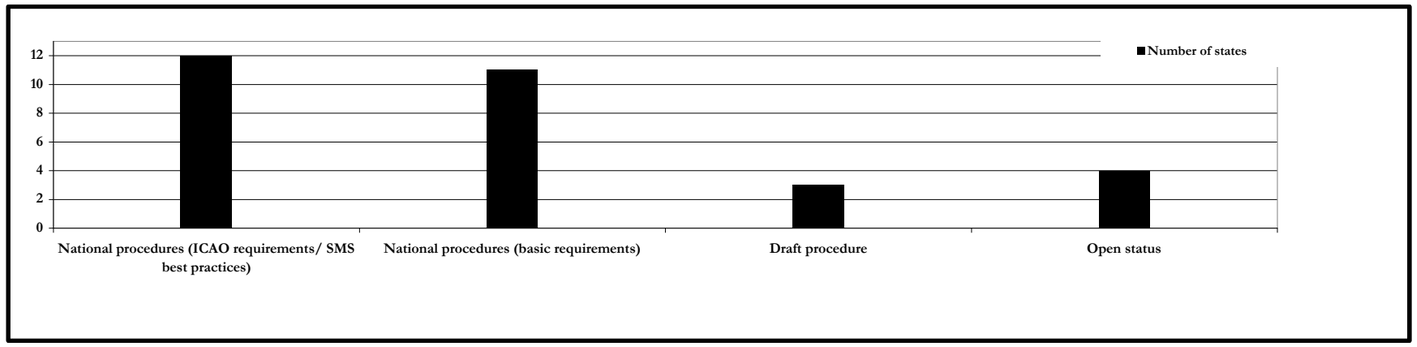
Stated by the interviewees

A National procedure(s) exist which cover the ICAO requirements and SMS best practices
B National procedure(s) exist which cover the basic requirements
C Draft procedure, not adopted/ not enforced
D Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

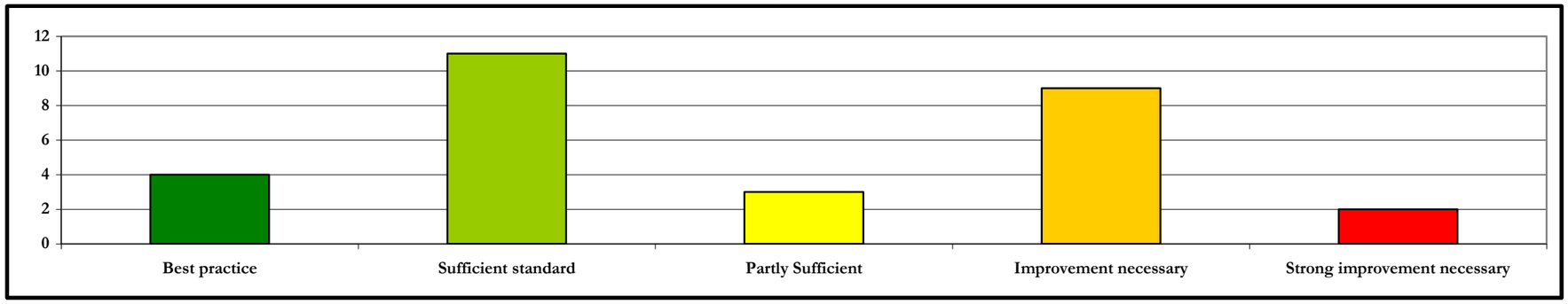


Figure 13: Matrix "Legal Framework for SMS"

2.3.1.2 APPLICABILITY OF SMS REQUIREMENTS ACCORDING TO THE STANDARDS SET BY THE CAA

	D	A	A	C	A	A	C	C	A	D	A	B	A	A	E	C	D	B	C	A		C	D	E	C	A	B	C	C	D	A

- Within this area the category of aerodromes which are requested to implement an SMS is shown and assessed
- A to D represent the different scopes of application of SMS requirement to the types of aerodromes
- The colours represent the assessment of the authors

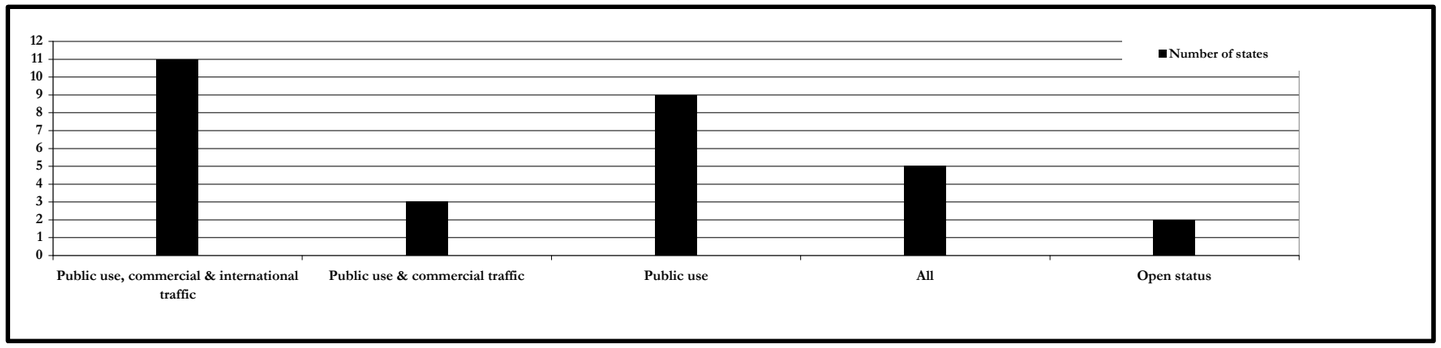
Stated by the interviewees

A Public use, commercial & international traffic aerodromes
B Public use & commercial traffic aerodromes
C Public use aerodromes
D All aerodromes
E Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

Figure 14: Matrix "Applicability of SMS Requirements According to the Standards of the CAA"

2.3.1.3 SCOPE AND STRUCTURE OF THE SMS, AS REQUIRED BY THE CAA

B	B	B	A	C	B	B	B	B	C	B	A	A	C	C	B	A	A	A	A		B	B	C	A	C	C	B	A	C	C

- Within this area the complexity and extent of the national legal requirements for SMS are described and assessed (taking into account the requirements of the CAA)
- A represents a complex SMS including all parts and standards that represent the state of the art SMS ideas
- A to C represent the current situation
- The colours represent the assessment of the authors

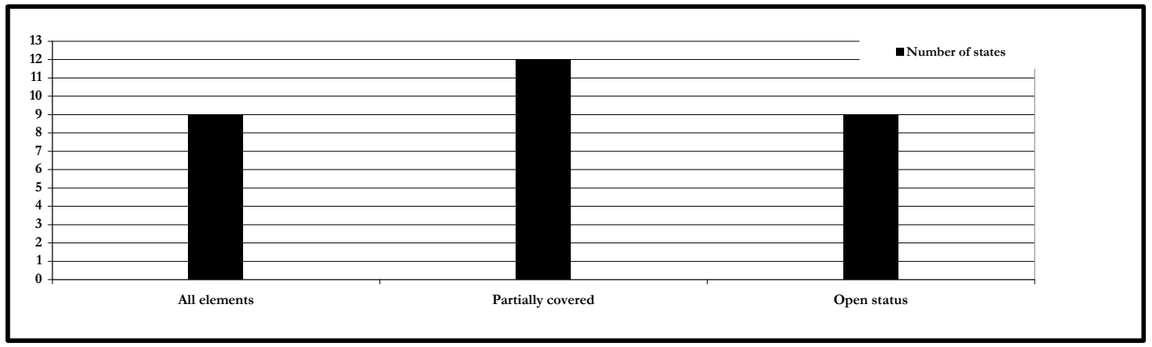
Stated by the interviewees

A Complex SMS including all parts and standards that represent the state of the art SMS ideas
B Partially covered
C Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

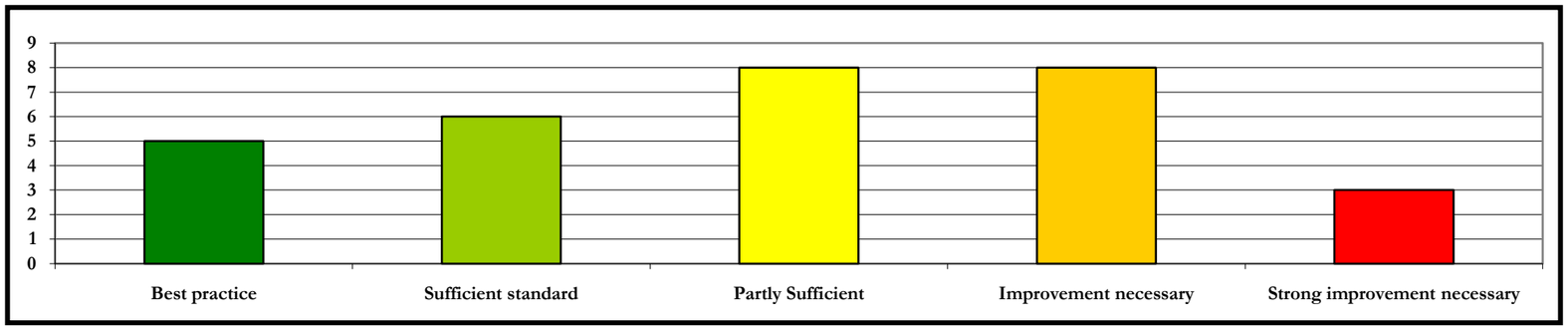


Figure 15: Matrix "Scope and Structure of the SMS, as Required by the CAA"

2.3.1.4 IMPLEMENTATION STATUS OF LEGAL FRAMEWORK FOR SMS (CAA)

A	B	A	B	C	B	B	C	B	D	B	B	A	D	C	A	A	B		A		C	A	D	A	D	C	C	A	D	C

- Within this area the implementation status of the national aerodrome SMS is described
- A to D represent the different levels of implementation
- The colours represent the assessment of the authors

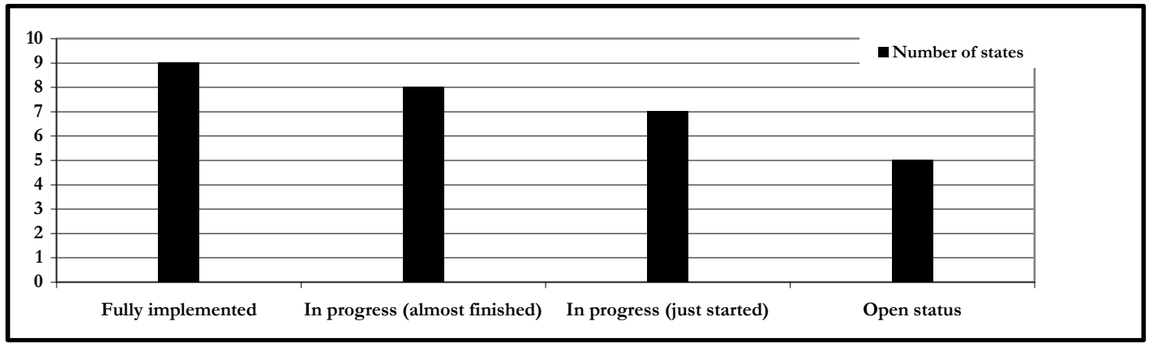
Stated by the interviewees

A Fully implemented
B In progress and almost finished
C In progress but just started
D Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

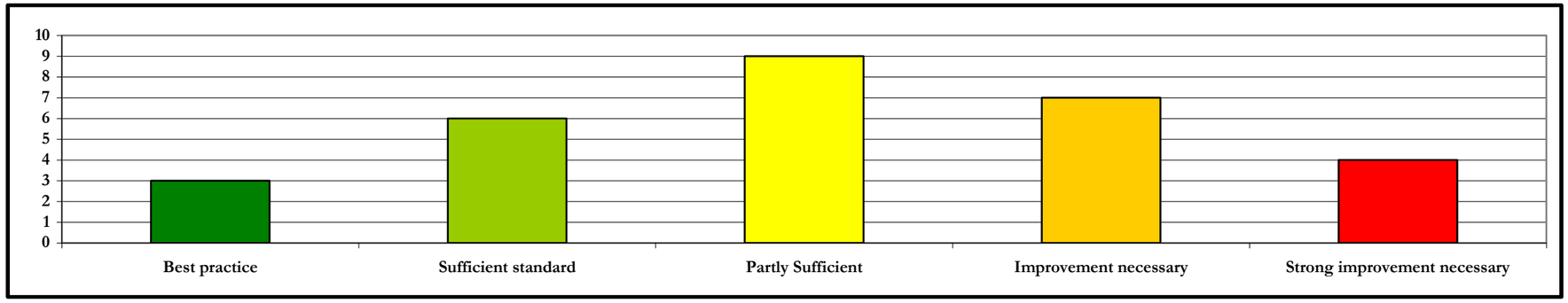


Figure 16: Matrix "Implementation Status (CAA)"

2.3.1.5 THIRD PARTY INVOLVEMENT AS REQUIRED BY THE CAA (CAA)

C	A	C	B	A	B	B	C	B	C	A	C	A	C	C	A	A	A		C		C	B	C	A	C	C	A	A	C	C

- Within this area the status of the required involvement of third parties at the aerodrome in the aerodromes' SMS is described
- A to C represent the status of involvement
- The colours represent the assessment of the authors

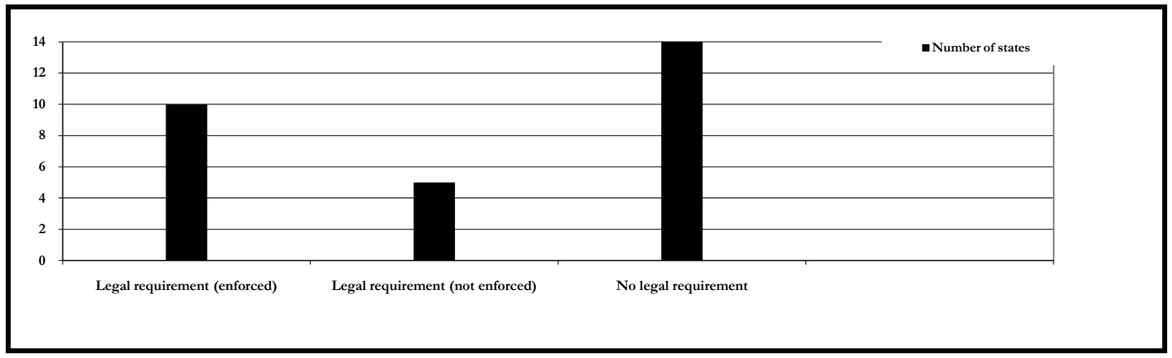
Stated by the interviewees

A Legal requirement exists and is enforced
B Legal requirement exists but not enforced
C No legal requirement exists

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

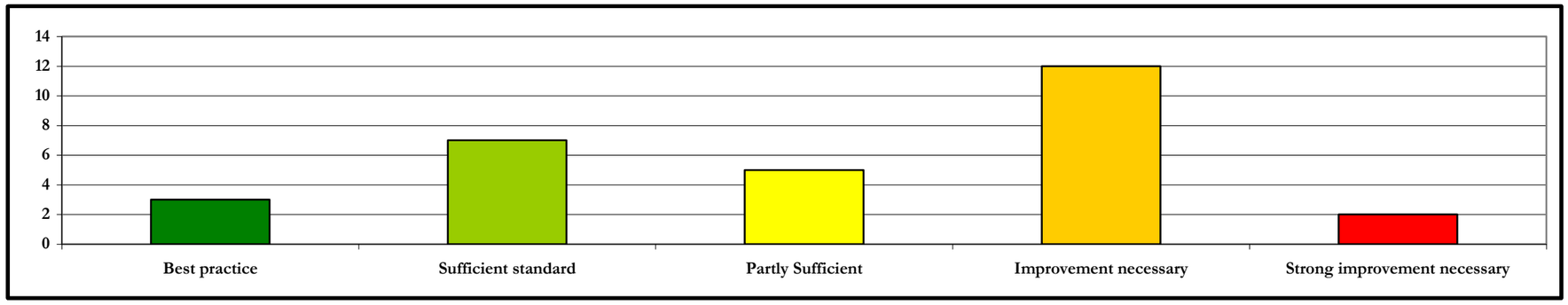


Figure 17: Matrix "Third Party Involvement (CAA)"

2.3.2 PART "AERODROME"

2.3.2.1 SCOPE AND STRUCTURE OF THE SMS AS IMPLEMENTED BY THE AERODROMES (AERODROME)

	B	B	B	B	B	C	B	A	A	B	A	A	A	A	C	B	A	A		A		B	B	C	A	C	B	B	A	C	B

- Within this area the complexity and extent of the specific SMS at the visited aerodromes is described and assessed
- This area shows indirectly also the level of comparability between authorities' demands and the actual situation at the national aerodromes
- A to C represent the current situation
- The colours represent the assessment of the authors

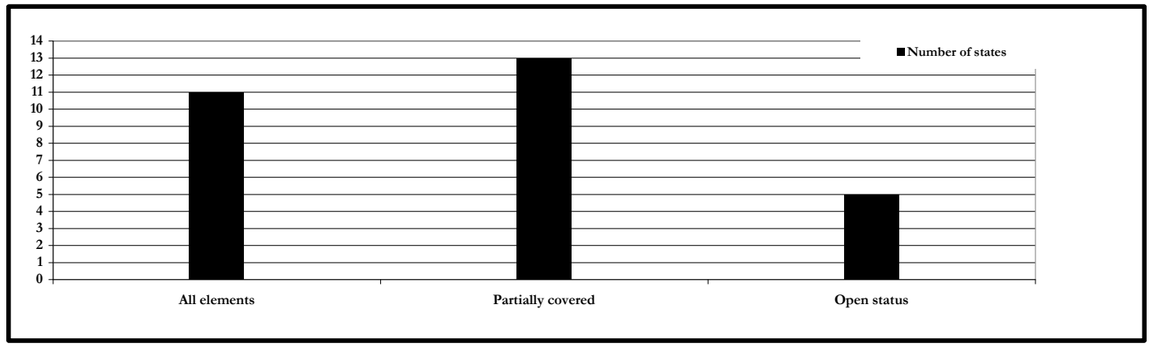
Stated by the interviewees

A All required elements of an SMS are covered
B Partially covered
C Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

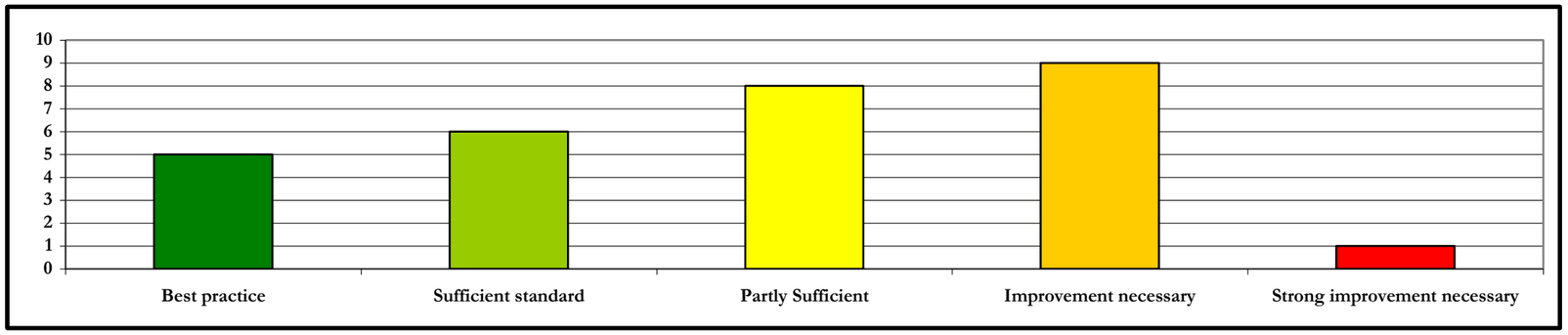


Figure 18: Matrix "Scope and Structure (Aerodrome)"

2.3.2.2 IMPLEMENTATION STATUS OF SMS AT THE AERODROMES VISITED (AERODROME)

A	B	A	B	B	B	B	B	B	C	B	B	A	A	C	B	B	B		B		C	B	C	A	D	D	C	A	C	C

- Within this area the implementation status of the national aerodrome SMS concept is described, taking into account the current situation at the visited aerodromes
- A to D represent the different degree of implementation
- The colours represent the assessment of the authors

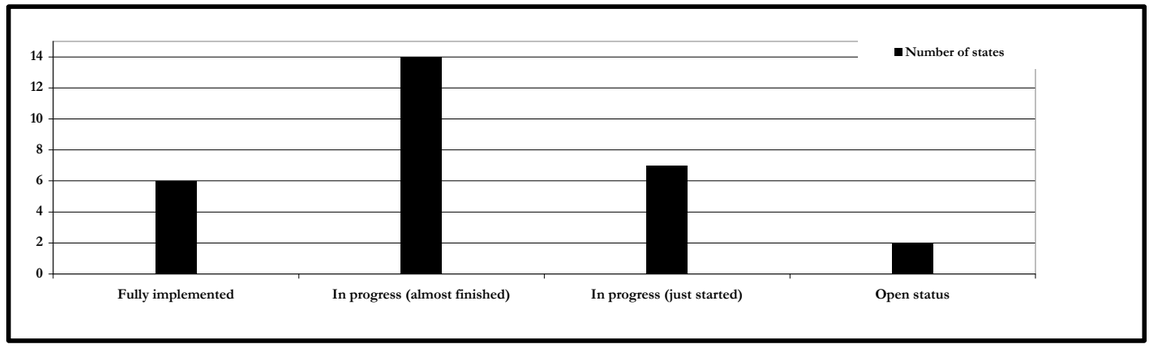
Stated by the interviewees

A Fully implemented
B In progress and almost finished
C In progress but just started
D Open status

Opinions by the authors

Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees



Opinions by the authors

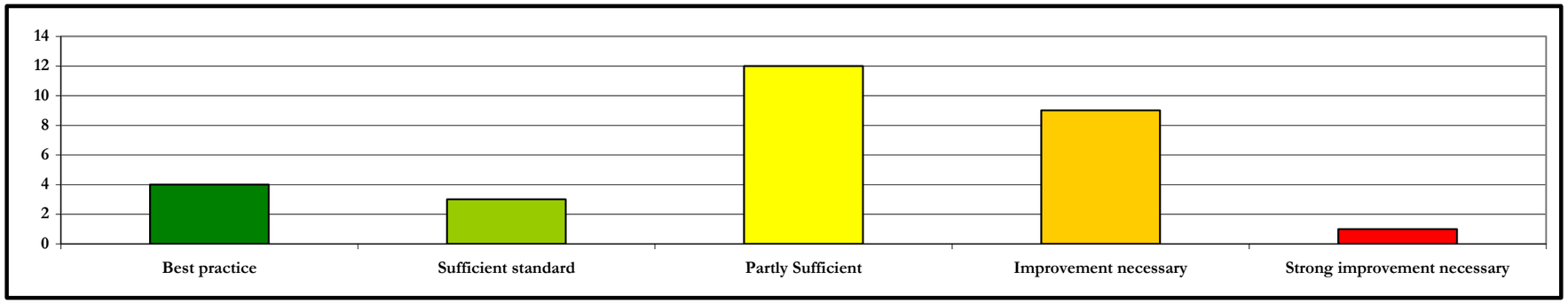


Figure 19: Matrix "Implementation Status of SMS at the aerodromes visited (Aerodromes)"

2.4 TECHNICAL ASSESSMENT OF AERODROMES

Within the technical assessment at the visited aerodromes, the project team carried out a verification of the implementation status of a sample of ICAO Annex 14 Standards and Recommendations.

A total of 56 aerodromes were visited during this study (29 large, 22 medium and 5 small). The selection of these aerodromes aimed at having a representative sample and accounting for the diversity of the European aerodromes, in terms of complexity and volume of air operations as well as of financial and technical capacity.

The aerodromes are therefore divided into the three categories "large", "medium", and "small", according to the following criteria:

Large:

- The most important aerodrome of the country (in terms of movements), capable to accommodate large aircraft and scheduled international commercial traffic
- All weather operations, warranting the highest level of safety, operational availability and capacity

Example: *Aeroporto Leonardo da Vinci di Fiumicino (ICAO Code: LIRF; Aerodrome Operator: Aeroporti di Roma SpA; Movements: 315 627; Passengers: 32 800 000)*

Medium:

- Aerodrome of regional importance for the country, capable to accommodate scheduled national or international commercial traffic
- Aerodrome having a number of movements per year around the national average

Example: Ibiza Airport (ICAO Code: LEIB; Aerodrome Operator: Aeropuertos Españoles y Navegación Aérea (AENA); Movements: 57 233; Passengers: 4 647 360)

Small:

- Serves mainly general aviation
- VFR traffic
- Capability to handle traffic over 2.73 t MTOW
- AIP available

Example: Rome Urbe Airport (ICAO Code: LIRU; Aerodrome Operator: Aeroclub Rome; Movements: not available; Passengers: not available)

Small aerodromes however, were only visited during the first phase of the study. During the second phase, those were replaced by medium size aerodromes, in line with the applicability of Regulation 1108/2009.

In addition, according to the EASA tender specifications:

- Three aerodromes have been selected (one large, one medium, one small/medium) if the country has more than 20 million inhabitants[4]
- Two aerodromes have been selected (one large, one medium or small) if the country has between 5 and 20 million inhabitants
- One aerodrome has been selected (the most important in the country) if the country has below 5 million inhabitants

Furthermore, in case two or more aerodromes shall be selected within one single country, the selection has been performed – as far as possible – to avoid aerodromes operated or owned by the same entities.

[4] Except in Germany, where only two aerodromes (one large and one medium) have been visited.

The subset of ICAO Annex 14 SARPs to be analysed have been selected according to the following methodology:

1. Initial selection of topics on the basis of the "ESSENTIAL REQUIREMENTS FOR THE SAFETY AND INTEROPERABILITY REGULATION OF AERODROMES (Infrastructure and operations)" in Annex V of Regulation 1108/2009.
2. Selection of all ICAO Annex 14 SARPs corresponding to the previously identified topics of the essential requirements.
3. Further selection according to the ICAO Annex 14 SARP's
   - Safety relevance (impact of deviations to the SARP's on safety)
   - Likelihood of non-conformity
   - Availability of documentation on the Key Standards and Recommendations from ICAO Annex 14 SARP's (e.g. in AIP, aerodromes and obstacle charts)
   - Effort required to verify compliance on- and off-site
   - Types of SARP's
     - Standards
     - Recommendations
     - with Reference to external document (e.g. Guide and Manual)
     - accepting in case of deviation other means of compliance (aeronautical study)

The list of the selected ICAO Annex 14 SARP's is provided in Annex 2 of this document.

2.4.1 UTILISATION OF THE ICAO DOCUMENTS

Small Aerodromes						C	-					C	C					C									A				
Medium Aerodromes	C	A	A	A			A	A		A A	A	C	C	A	A			A						A	A	C A		A A	A		A
Large Aerodromes	A	A	A	A	A	A	A	A	A	A	A	A	D	A	A	A	A	A	-	A		A	A	A	A	A	A	A	A	C	A

- Within this area the utilisation and availability of ICAO documents like Annex 14 and further guidance material like aerodrome design manuals or safety management manual is described.
- The letters A to D relate to the legal documents (ICAO Annexes or national regulations) and respective guidance material (ICAO or national documents) used by the aerodromes.
- A to D represent the different degree of utilisation of ICAO documents.
- The colours represent the assessment of the authors.
- The rating "best practice" is assigned to the utilisation and availability of ICAO Annexes and guidance materials, to all relevant employees as well as the aerodrome participation in international working groups.

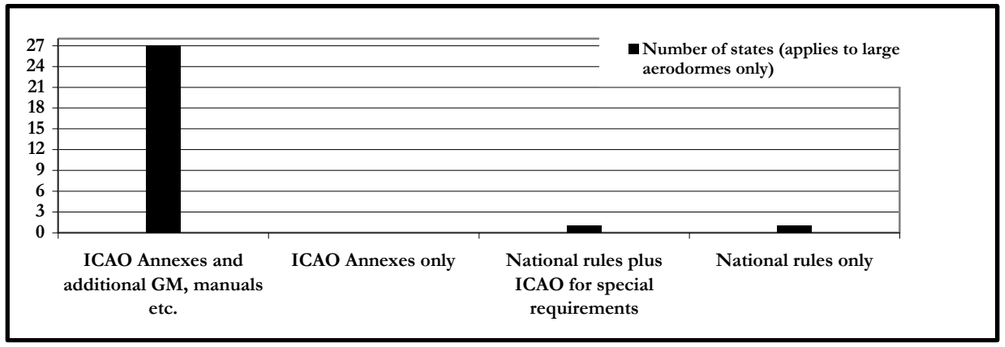
Stated by the interviewees

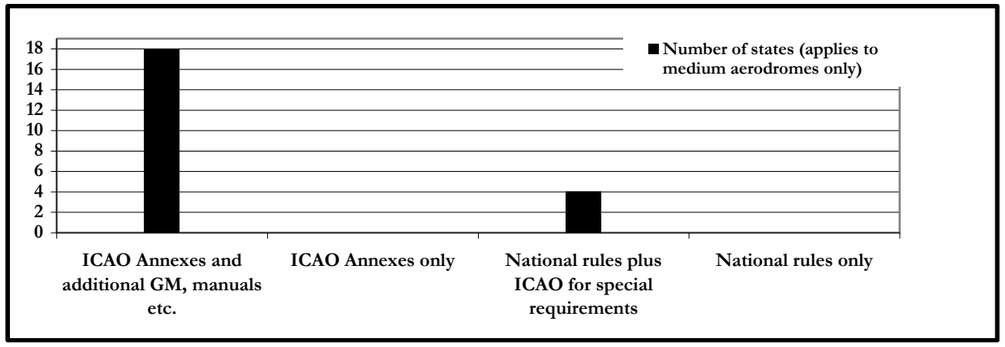
A ICAO Annexes and additional GM, manuals etc.
B ICAO Annexes only
C National rules plus ICAO for special requirements
D National rules only

Opinions by the authors

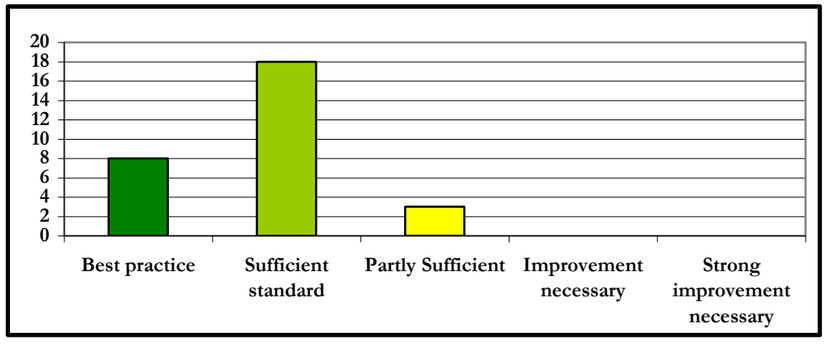
Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees





Opinions by the authors/ large aerodromes/ medium aerodromes



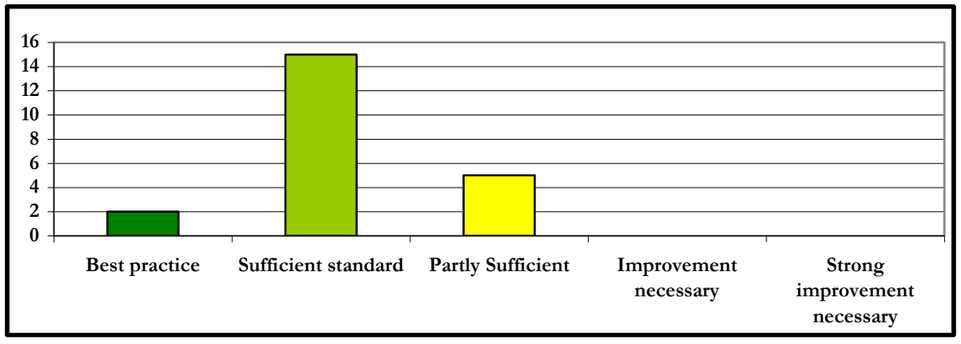


Figure 20: Matrix "Utilisation of the ICAO Documents"

2.4.2 AWARENESS OF DEVIATIONS BY THE CAA

Small Aerodromes						C	-					C	A					C									C				
Medium Aerodromes	C	A	C	C			C	C		A A	C	C	A	C	C			C						C	C	C C		C C	C		C
Large Aerodromes	C	A	C	A	B	A	A	C	C	A	C	C	A	C	C	C	A	C	-	C		C	B	A	C	C	C	A	C	D	C

- Within this area the awareness of deviations from the applicable aerodrome regulations for infrastructure and operations is described.
- The letters A to D relate to the instruments (compliance lists, audit protocols) used by the aerodromes and / or the authority to manage deviations.
- The colours represent the assessment of the authors.
- The rating "best practice" is assigned to the utilisation by the aerodromes of an up-to-date compliance list.

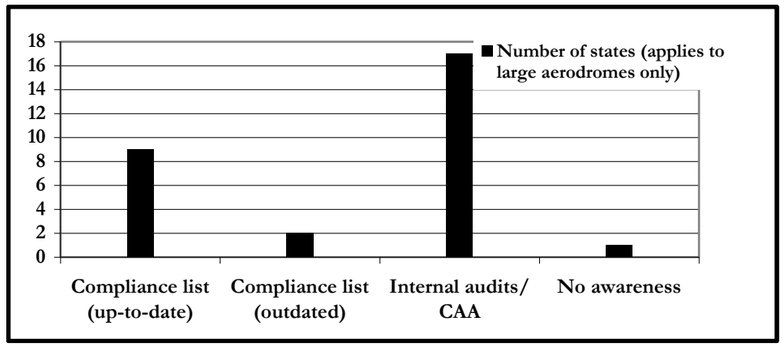
Stated by the interviewees

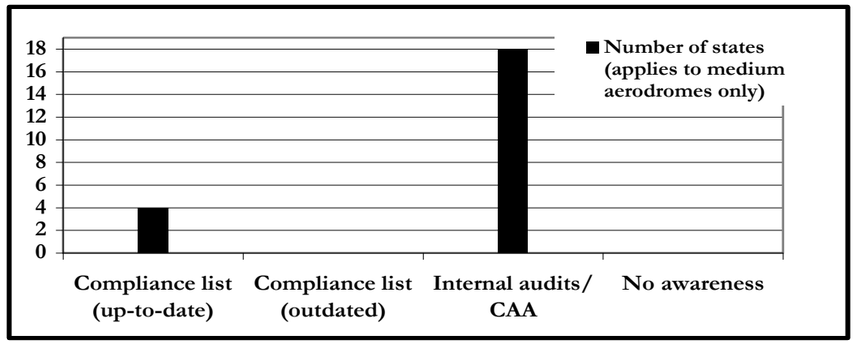
A Compliance list exists and is up-to-date
B Compliance lists exists, but is outdated or incomplete
C Internal audits or CAA audits protocols
D No comprehensive awareness of deviations

Opinions by the authors

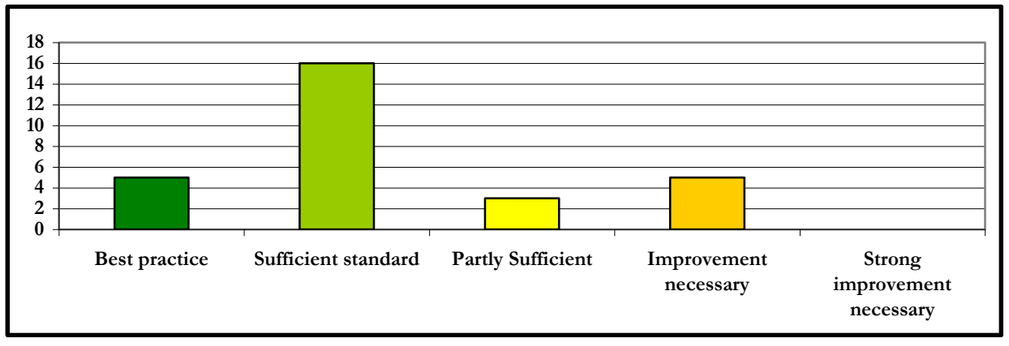
Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees





Opinions by the authors/ large aerodromes/ medium aerodromes



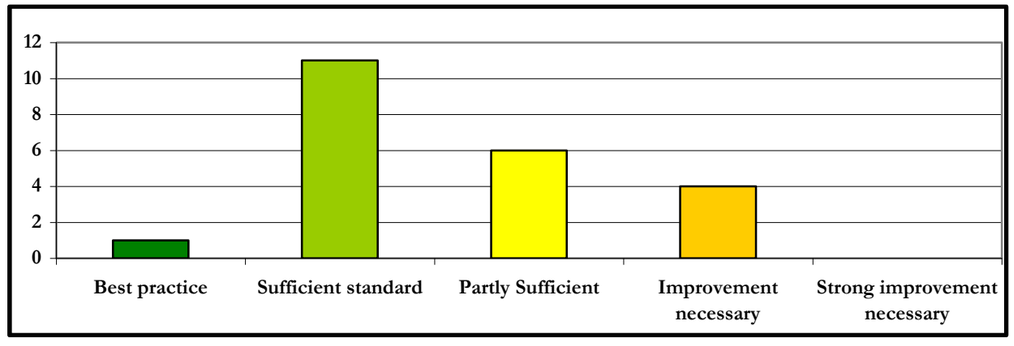


Figure 21: Matrix "Awareness of Deviations"

2.4.3 HANDLING OF DEVIATIONS BY THE AERODROMES

Small Aerodromes						D	-					B	B					D									C				
Medium Aerodromes	D	B	B	B			B	B		B	B	C	A	A	B	C			A						B	A	D B		C C	A		C
Large Aerodromes	A	B	C	A	C	A	A	A	A	B	C	A	A	A	B	B	B	A	-	C		C	B	B	A	B	A	B	A	D	C

- Within this area the handling of deviations from the applicable aerodrome regulations for infrastructure and operations is described.
- The letters A to D relate to the procedure used by the aerodromes and/ or the authority to assess deviations.
- The colours represent the assessment of the authors.
- The rating "best practice" is assigned to the systematic performance of safety assessments for all deviations in combination with a long term approach to the management of deviations.

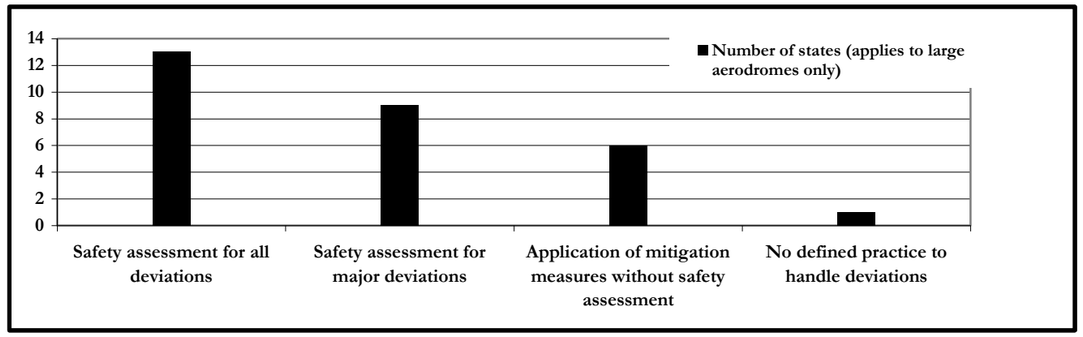
Stated by the interviewees

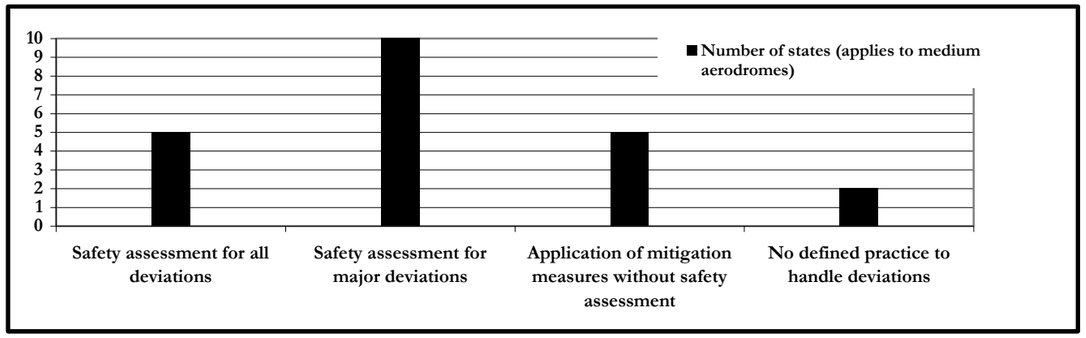
A Safety assessment for all deviations
B Safety assessment for major deviations
C Application of mitigation measures without safety assessment
D No defined practice to handle deviations

Opinions by the authors

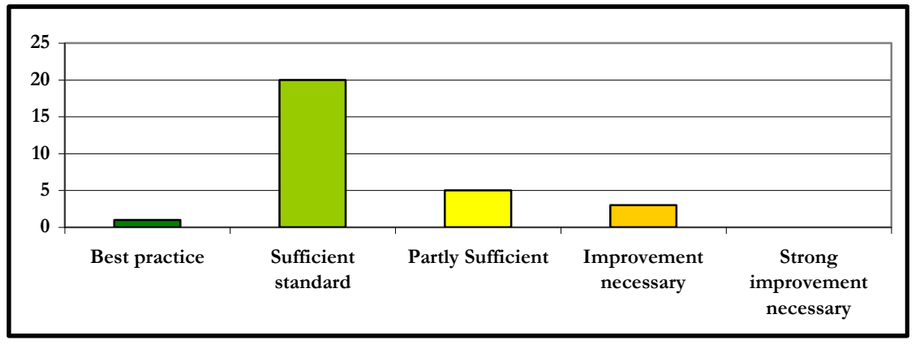
Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees





Opinions by the authors/ large aerodromes/ medium aerodromes



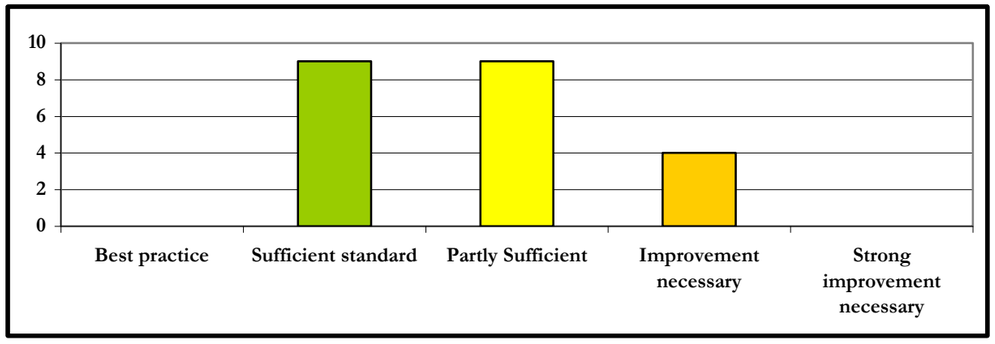


Figure 22: Matrix "Handling of Deviations"

2.4.4 SAFETY MANAGEMENT SYSTEM (SMS)

Small Aerodromes						D	-					D	C					D									D				
Medium Aerodromes	B	A	A	C			A	A		B B	A	A	A	A	D			A						A	B	A B		C C	A		C
Large Aerodromes	B	B	A	B	-	B	A	B	A	A	A	A	A	A	B	A	A	A	-	C		C	C	A	B	B	C	C	A	D	C

- Within this area the State of Safety Managements Systems at the Aerodromes visited are described.
- The letters A to D relate to the actual implementation status of the Safety Managements Systems at the aerodromes.
- The colours represent the assessment of the authors.
- The rating "best practice" is assigned to a fully implemented and working Safety Management System.

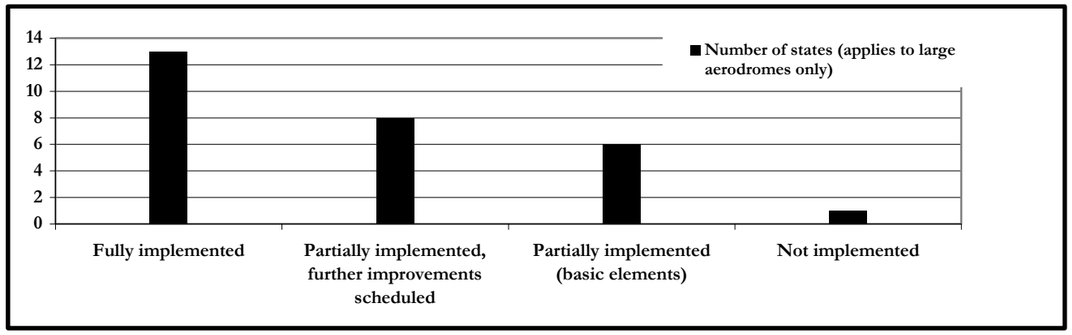
Stated by the interviewees

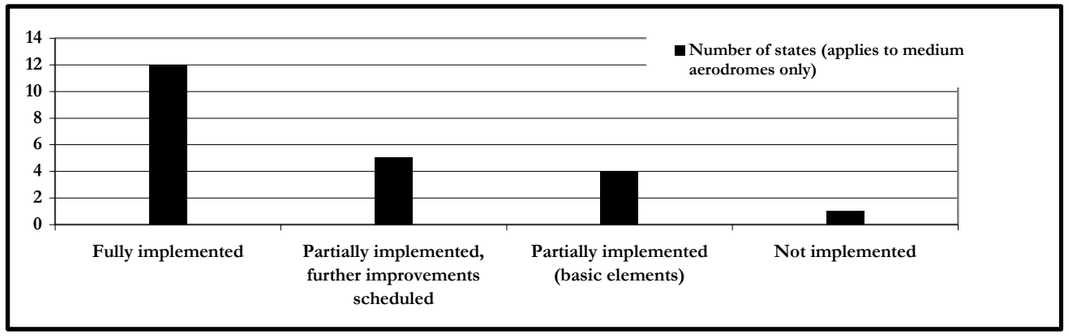
A Fully implemented
B Partially implemented, further improvements scheduled
C Partially implemented (basic elements)
D Not implemented

Opinions by the authors

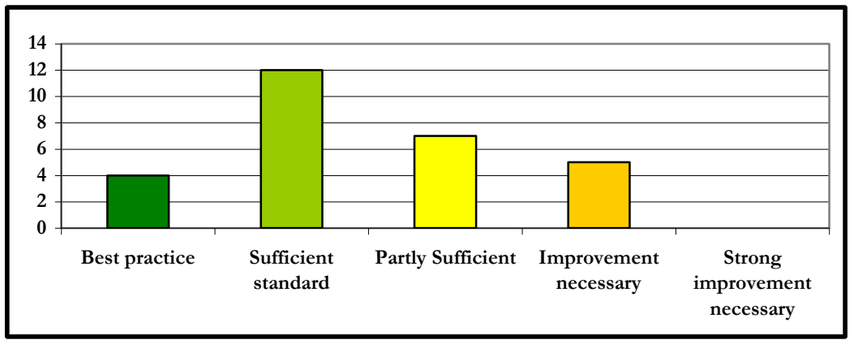
Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees





Opinions by the authors/ large aerodromes/ medium aerodromes



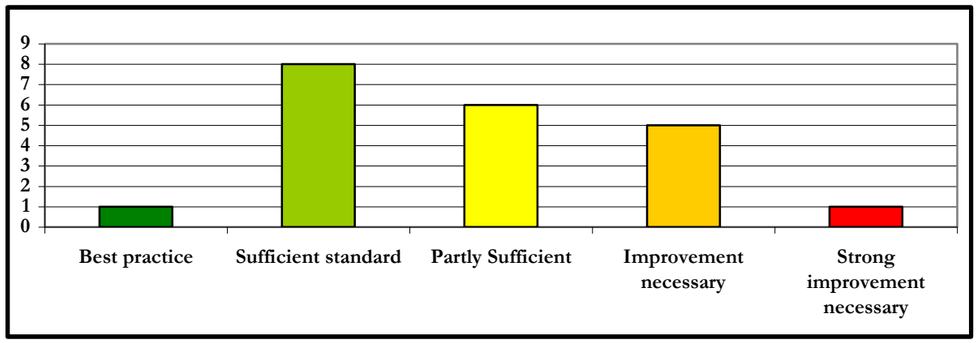


Figure 23: Safety Management System

2.4.5 CHANGE MANAGEMENT

Small Aerodromes						C	-					A	A					C									C				
Medium Aerodromes	B	B	C	B			C	C		B C	A	A	A	A	C			A						A	B	C C		C C	C		C
Large Aerodromes	A	C	C	A	C	A	B	A	A	B	A	A	B	A	B	A	A	A	-	C		C	C	A	A	C	A	C	A	C	C

- Within this area the handling of changes (infrastructural and operational) is described.
- The letters A to C relate to the procedure used by the aerodromes and / or the authority to manage changes.
- The colours represent the assessment of the authors.
- The rating "best practice" is assigned to the systematic performance of safety assessments for every change, whether the change is in compliance to applicable regulations or not.

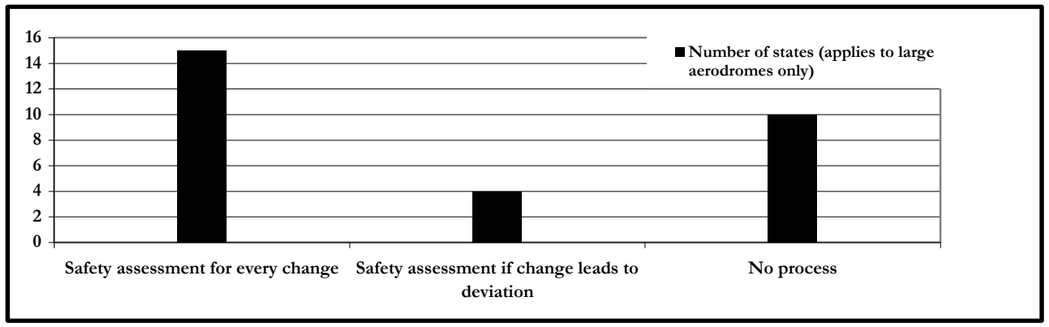
Stated by the interviewees

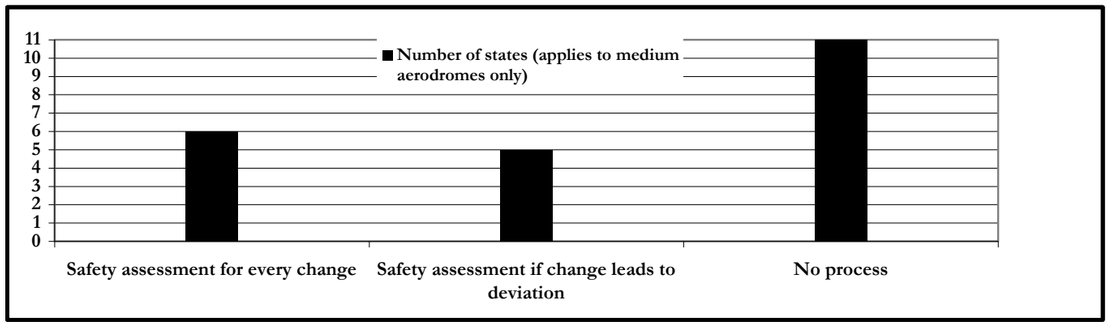
A Safety assessment for every change
B Safety assessment if change leads to deviation
C No process

Opinions by the authors

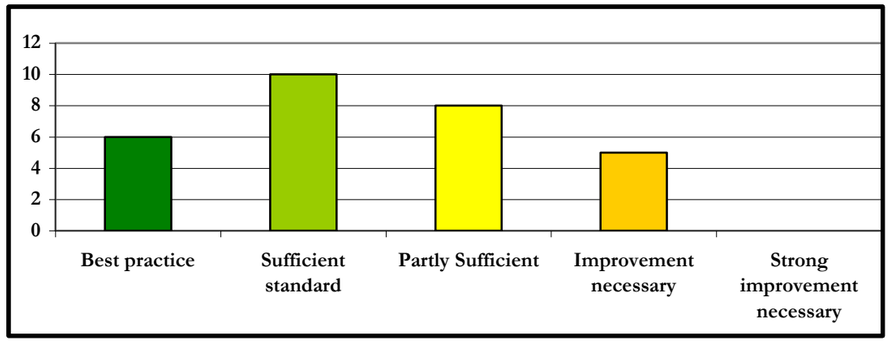
Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees





Opinions by the authors/ large aerodromes/ medium aerodromes



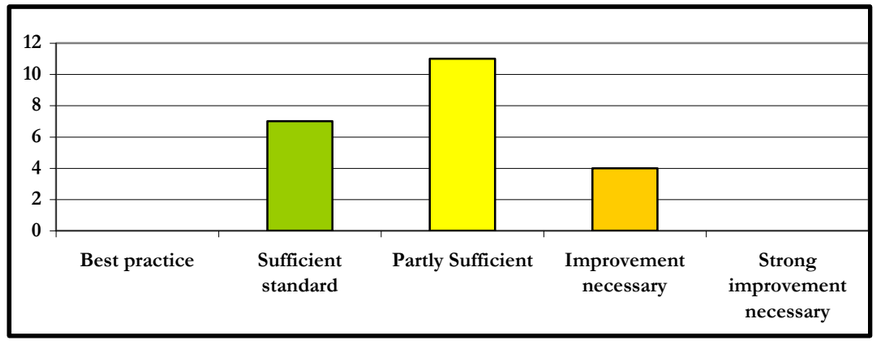


Figure 24: Matrix "Change Management"

2.4.6 COMPLIANCE WITH THE ICAO STANDARDS

Small Aerodromes						C	-					B	B					A									C				
Medium Aerodromes	B	A	C	B			B	C		C B	A	B	A	B	A			B						B	B	A B		C C	B		A
Large Aerodromes	B	B	C	B	C	A	B	B	B	B	A	B	B	A	A	A	C	B	-	B		B	C	B	A	B	A	C	A	C	C

- Within this area the compliance of the aerodromes with ICAO Annex 14 Standards is described.
- The letters A to C defines the current compliance of the aerodromes to ICAO Standards.
- The colours represent the assessment of the authors.
- The rating "best practice" is assigned to aerodromes that are fully compliant to ICAO Standards.

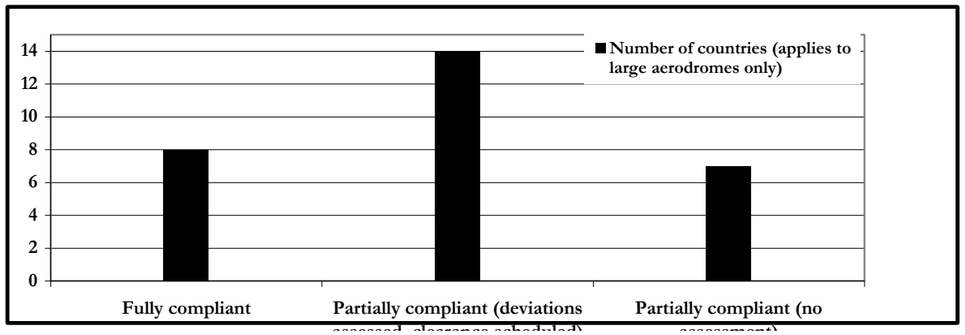
Stated by the interviewees

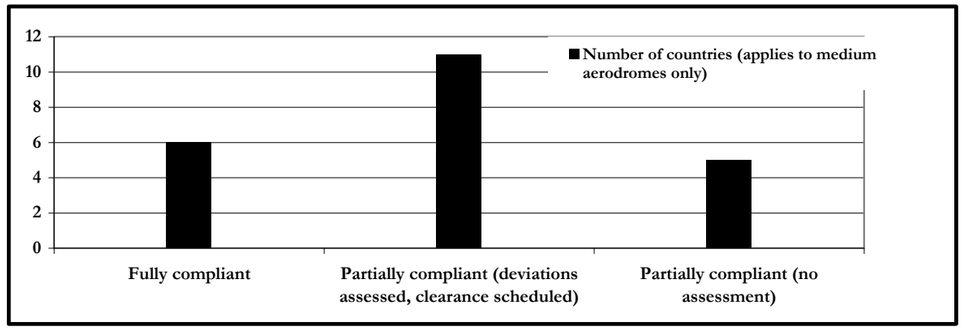
A Fully compliant
B Partially compliant and deviations assessed or resolution scheduled
C Partially compliant and no assessment

Opinions by the authors

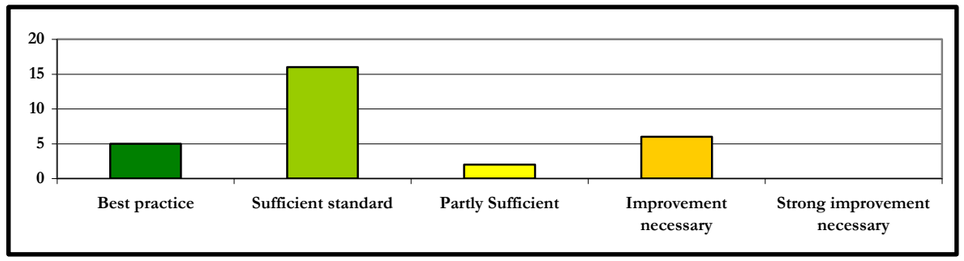
Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees





Opinions by the authors/ large aerodromes/ medium aerodromes



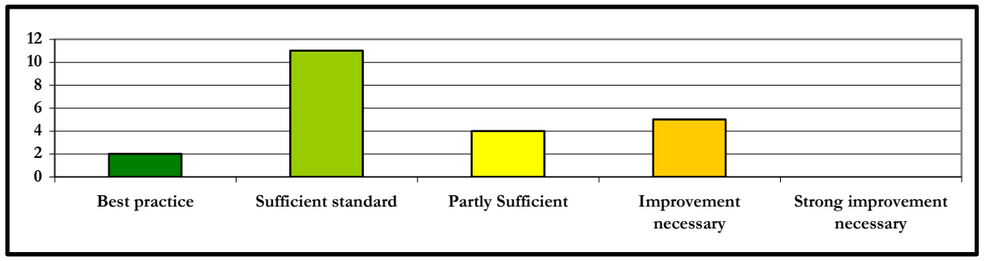


Figure 25: Matrix "Compliance with the ICAO Standards"

2.4.7 COMPLIANCE TO THE ICAO RECOMMENDATIONS

Small Aerodromes						A	-					A	B					A									C				
Medium Aerodromes	C	C	A	B			B	C		C	C	B	B	B	B	C			C						C	B	C	C		C	C	C		A
Large Aerodromes	C	B	C	B	C	C	B	B	C	B	C	B	B	C	B	C	C	A	-	B	-	C	C	B	B	C	B	B	A	C	A

- Within this area the compliance of the aerodromes with ICAO Annex 14 Recommendations is described.
- The letters A to C defines the current compliance of the aerodromes to ICAO Recommendation.
- The colours represent the assessment of the authors.
- The rating "best practice" is assigned to aerodromes that are fully compliant to ICAO Recommendations.

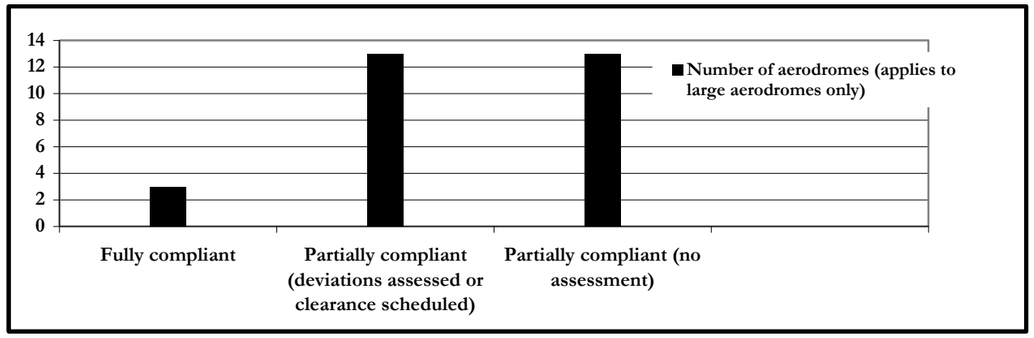
Stated by the interviewees

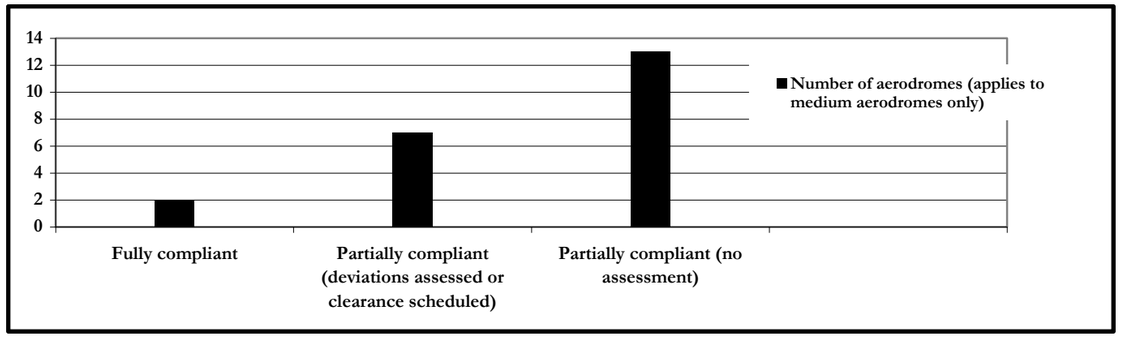
A Fully compliant
B Partially compliant and deviations assessed or resolution scheduled
C Partially compliant and no assessment

Opinions by the authors

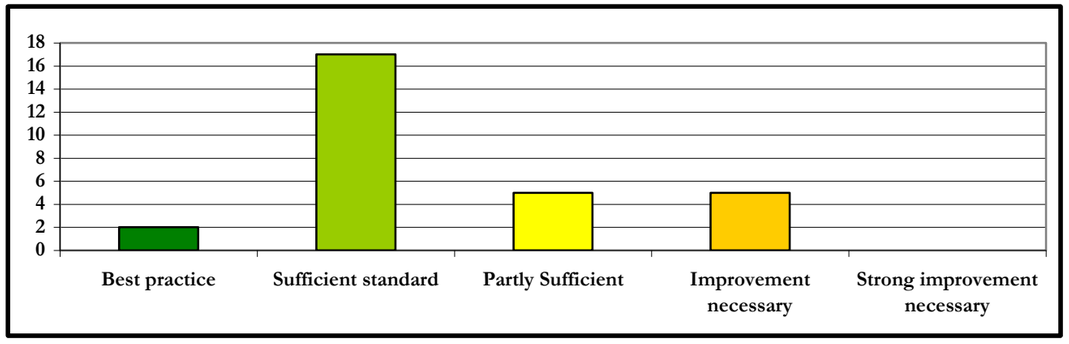
Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

Stated by the interviewees





Opinions by the authors/ large aerodromes/ medium aerodromes



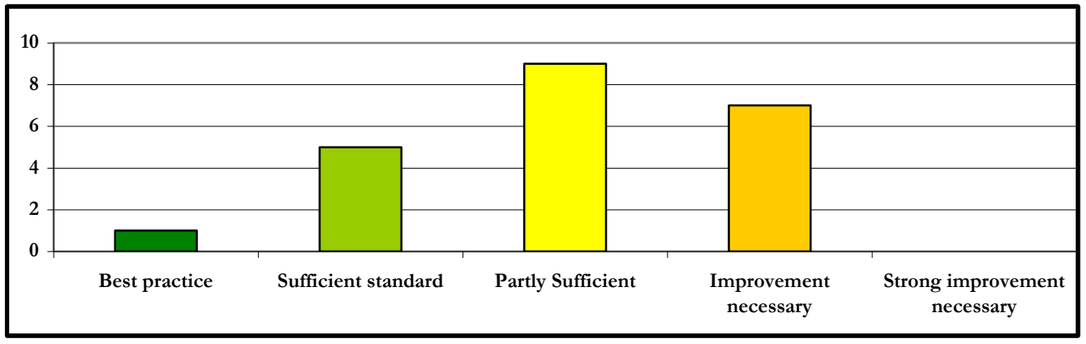


Figure 26: Matrix "Compliance with the ICAO Recommendations"

II AGGREGATED RESULTS OF THE STUDY

In this section the various differences and problem areas as revealed by the individual matrixes are explained using some outstanding or especially exemplary national characteristics, and first conclusions regarding the possible impact of the new European aerodrome standards are drawn. For ease of understanding, the analyses follow the same order chosen for the structure of the questionnaires and the individual monographs of the countries. This results in the following four subsections:

1. Legal Framework and Authorities;
2. Certification of Aerodromes;
3. Safety Management Systems;
4. Technical Assessment of Aerodromes.

The introductory first part of these sections provides a graphic overview for all individual countries showing the current status in relation to "best practice" in the individual areas. This allows for a quick orientation between the individual countries. Based on these aggregated results the critical points can be identified. It becomes quite apparent, for instance, where there is a need for improvement within the authorities or at the aerodromes, which areas cause problems for aerodrome operation or oversight due to constitutional or other difficulties or where the current system is generally flawed in.

These aggregated results are explained in detail and first conclusions are drawn. These results also form the basis for references, already included where appropriate, to necessary legal regulations and standards in the new regulatory framework to be worked out for Europe's airports.

They are supplemented by subsequently summarized references to national regulations of individual cases and particular national solutions, best practices encountered, but also by critical comments on problematic areas.

1 HORIZONTAL ANALYSIS OF LEGAL FRAMEWORK AND THE COMPETENT AUTHORITIES FOR AERODROME SAFETY

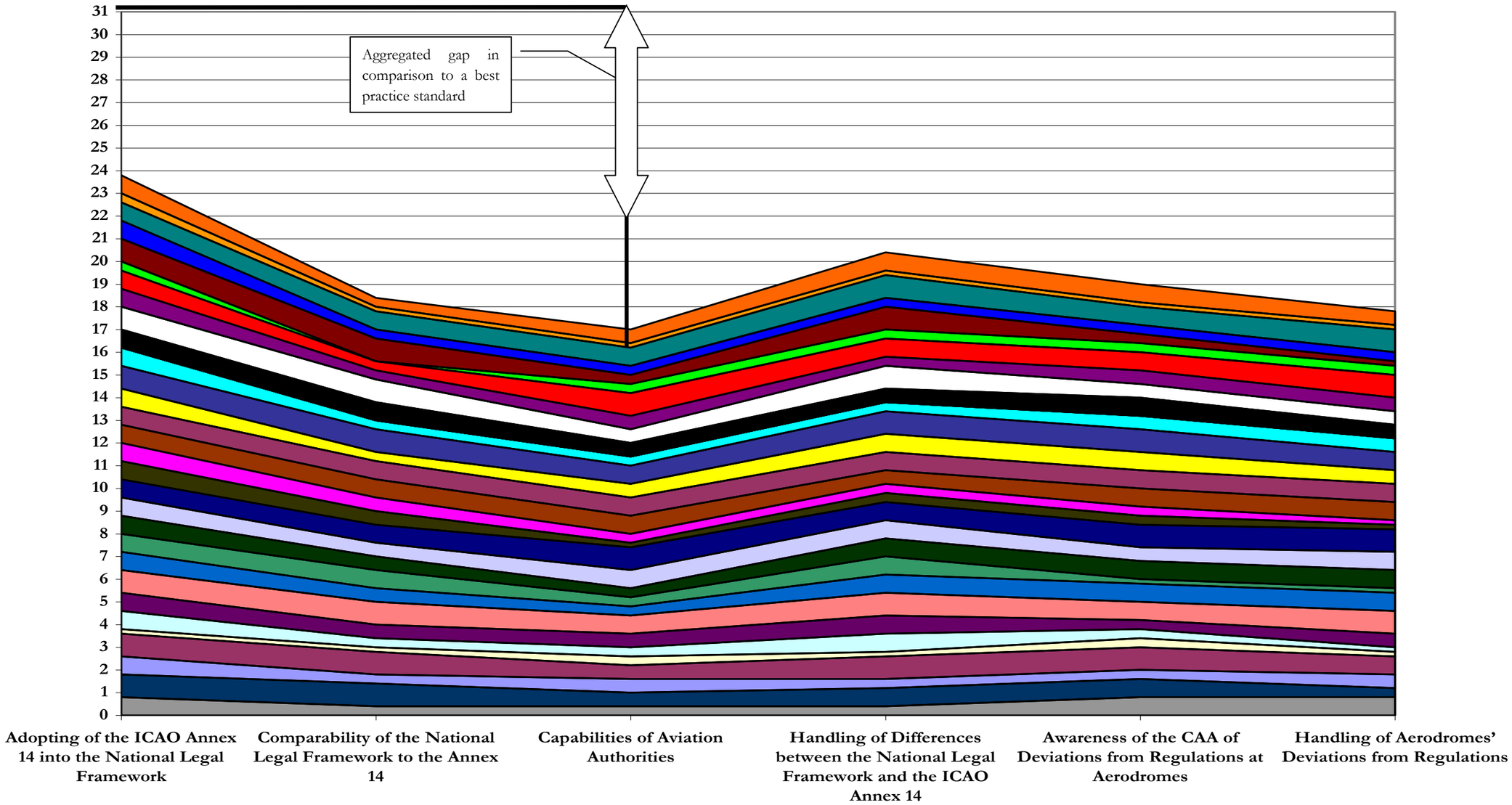


Figure 27: Gap Analysis "Horizontal Analysis of Legal Framework and Competent Authorities for Aerodrome Safety"

Explanations
The tables in PART I always indicate so-called "opinions by the authors" as well by stating a specific colour.

Opinions by the authors
Best practice
Sufficient standard
Partly sufficient
Improvement necessary
Strong improvement necessary

It is possible to quantify a specific single "opinion": If the authors evaluated a certain situation e.g. as "best practice" this can be quantified with the integer 1. As there are five different "opinions", there are five different numbers (20% decrease starting from "best practice" going down to "strong improvement necessary"). By adding up each quantified "opinion" for each specific subpart of "Legal framework and authorities," the above figure can be calculated.

A specific example is given for the first item "Adopting of the ICAO Annex 14 into the National Legal Framework". Given the fact that there are five levels (Best practice 1.0, Sufficient solution 0.8, Partly sufficient 0.6, Improvement necessary 0.4, and Strong improvement necessary 0.2), the first item "Adopting of the ICAO Annex 14 into the National Legal Framework" was assessed by the authors as "Sufficient standard" for Austria (AT). Hence, this item is quantified with the integer 0.8. For Switzerland (CH) which is an ink ribbon above Austria (alphabetical order), the "Adopting of the ICAO Annex 14 into the National Legal Framework" was estimated to be a "Best practice". Hence, this item is quantified with the integer 1.0. Assuming that there is no other country data in the above figure, the total of 1.8 (0.8 + 1.0) gives an idea of the level of improvement necessary, given the aim that all states use best practice approaches (1.0 + 1.0 = 2). Using this methodology a horizontal gap analysis can be performed, basically answering the question "Where do the authors see the biggest potential for improvement?"

The following conclusions can be drawn from the figure:
Level of competence or performance of a specific country
Each country has its own colour. The wider an ink ribbon, the stronger the competence or performance. Each ink ribbon has a maximum width of "1" and a minimum width of "0.2". However, countries are benchmarked against best practice. They are not compared with each other.

Peaks and valleys
The figure provides an idea of overall strengths (peaks) and weaknesses (dents) for the entire sample of states.

1.1 INTRODUCTION

The introductory survey of this range of issues in the matrix shows that significant deviations from the ideal – the so-called "best practice" – shows up at very limited times especially in this area.

These deviations particularly concern the conformity of legal standards with the respective standards of ICAO Annex 14 and the resulting problems. The individual problems can be attributed in no small part to insufficient capacities in the competent authorities, but also sometimes particularly to fundamental constitutional problems that complicate national legislative processes and general rulemaking activities.

1.2 ADOPTION OF THE ICAO ANNEX 14 INTO THE NATIONAL LEGAL FRAMEWORK

Most countries visited within the scope of this study already established basic standards and procedures regarding the national implementation of international standards such as the ICAO Annex 14 SARPs' a long time ago. This means that after the country joined ICAO and after the accession was formally ratified by parliament, the responsibility for issuing further regulations was determined and in most cases primarily assigned to the responsible ministries of transport.

Some countries went through these procedures decades ago while others – in particular young states, such as for example in Eastern Europe, which did not gain their independence until the 1990s – were not able to introduce these basic measures until quite recently. In some states, the late, or even unfinished, separation of the service provider/operator from the oversight entity also influenced the content and quality of the legal framework and the general rulemaking status. If the state has owned and operated aerodromes for very long, or partly still does, (and was sometimes also the ANSP), then the need for detailed, legal rules was frequently not seen much. Important legal requirements are missing, because the state did not want to enact them to regulate its own activity. The state was a member of ICAO and operated accordingly, at least in his own opinion. No special demand for legal rules was (and sometimes is not) seen. In such states, very often the organisational establishment of the newly independent oversight bodies also took time, as did the legal empowerment of such authorities.

The respective procedures chosen to legally implement ICAO Annex 14 standards were very different.

Some states implemented Annex 14 SARPs in various national regulations that at times regulate very specific details such as markings and signs at airports, obstacle limitation surfaces or small operational requirements for aerodromes.

Other states in turn have decided – perhaps for reasons of efficiency – to incorporate the entire Annex 14 in one single national regulation. In some cases that were done by a full "translation" of Annex 14 which then was adopted as a national rule (mainly sub act/regulation level). In one particular case <u>all</u> 18 ICAO Annexes have been incorporated in a single national regulation in one step. In another case, the "translation" of Annex 14 was just published in a so-called journal of the national authority, the content of which another national rule declared binding for the aerodromes. Although such an implementation concept had disadvantages due to the not-fully-constitutional adaptation method, implementation could at least be accomplished somehow.

A special solution was found in a very small country which, due to its small aviation environment, relied solely on a cooperation agreement with a bigger neighbouring state. That agreement – a formal legal contract – declared the neighbour's rules binding and also declared their aviation authority to be the oversight body for the smaller state's aviation companies.

Basically all these methods are suitable – with some legal and constitutional limitations – for the implementation. The differences and/or problems occur rather in the course of issuing and/or amending the rules. On the one hand, the legal quality or level of the respective national instrument with which Annex 14 SARP's are regulated in the state have implications here. For example, if the legal instrument is an ordinance/regulation below the level of an act, amendments to which are exclusively within the purview of the aviation authority, then a quick and comprehensive adaptation to new ICAO standards is most often possible. If, however, ICAO standards must be exclusively transposed by a law to be passed by parliament, the implementation of new ICAO standards can take considerable time and may also not be comprehensive. Parliamentary legislative processes almost always take a long time, often involve more than one chamber resulting in difficult procedures and are also very much influenced by day-to-day politics. Frequent political changes in government can stop rulemaking processes for years and can also greatly influence aviation-related matters.

Therefore, the higher the demands on the rule making process are and the "higher up" the responsibility for this was placed, the greater differences in terms of content and time between the Annex 14 standards and the national aerodrome regulations could be observed.

Only comparatively few states have chosen the approach to declare the latest ICAO Annex 14 standards as generally mandatory in their country. This method, also known as dynamic reference, has several decisive advantages:

Firstly, all new or amended ICAO standards are immediately applicable in the respective states upon being issued and/or coming into force. This assures a prompt and absolutely conforming application.

Secondly, the responsible authorities do not have to carry out any additional and often time-consuming procedures to implement the ICAO standards. Therefore they can concentrate their capacities on the direct and prompt implementation of standards and the oversight of their aerodromes.

In addition, they also free up resources to develop necessary guidance material and seminars for the new standards and make these available to the aerodromes. In those states that decided to take the dynamic reference approach one could most often also find better aviation-related regulatory and oversight activities overall. The disadvantage of dynamic referencing is that there is no control over the rulemaking process by the state and that an outside entity (ICAO) is setting standards. Such a transposition has no means to go beyond an ICAO standard where it may be advisable. Also, as there are sometimes discrepancies between different ICAO documents on the same subject, the authorities may be asked by the aerodromes to resolve these.

In only one state there had no national implementation of ICAO Annex 14 standards been taken place at all. ICAO membership was legally clarified in another state, but Annex 14's (and many other annexes') implementation process was still an open issue due to great demands on implementation procedure (parliamentary decision), and many political changes. In such states the long-term and legally binding implementation of international standards is only possible to a very limited extent and depends on the goodwill of the airports.

1.3 COMPARABILITY OF THE NATIONAL LEGAL FRAMEWORK TO THE ICAO ANNEX 14

The above problems and special national solutions in implementing ICAO standards are directly reflected in the observable problems of conformity between national standards and the current ICAO standards. Only in states that have established dynamic referencing to Annex 14 are there no differences whatsoever, since Annex 14 is directly and immediately applicable in those states.

If states, on the other hand, can only achieve the implementation of ICAO Annex 14 with national legislative procedures, then these generally take time due to the question of responsibilities and parliamentary legislative procedures, in which case differences are unavoidable. Therefore, differences to Annex 14 arise at least due to such delays which make implementation in the individual states more difficult. A typical example is the practical implementation of safety management systems, which in many states was started too late due to a lack of national standards. Consequently in many states the implementation is not fully completed up to this point in time and not been brought up to an acceptable level.

At times it is even possible – due to exertion of political influence during the legislative process – that permanent differences between national standards and ICAO standards arise and persist. Such situations could also be observed in states were a large or sometime just one operator operated all or the majority of the states' aerodromes.

The situation also is problematic in states that have established no procedures for the implementation of ICAO Annex 14 or have only done so very recently. Consequently the practical implementation at the various airports is often less than ideal, while the authorities' familiarity with technical, operational and safety standards can also not be fully guaranteed.

With a focus on one important infrastructural detail (discussed in some interviews with either CAA or aerodrome staff) it has to be noted that the ICAO SARP's on Runway End Safety Area (RESA) (especially the Recommendation) were not implemented at numerous medium and large airports. The CAA's as well as the aerodromes often mentioned the lack of clear objectives and more detailed specifications for RESAs'. In collaboration with ICAO, some states are participating in the review of the RESA specifications, to enable a refinement of the Standards and Recommendations, as well as to define alternative acceptable means of compliance. In contrast to that, some CAAs and aerodromes are not even recognising the potential necessity of the provision of a RESA longer than the 90 m of the relevant ICAO Standard 3.5.2.

The implementation of the RESA Recommendation is technically not feasible at several aerodromes (no space available) without incurring severe operational restrictions or costly infrastructural measures. Some aerodromes informally respect the Recommendation by keeping the required area available: however, these aerodromes do not publish the RESA in the AIP and cannot ensure that all related RESA requirements (absence of objects, clearing and grading). In detail, seven of the 56 aerodromes visited do not fulfil the Standards, 34 do not fulfil the Recommendations related to RESA's.

1.4 CAPABILITIES OF THE COMPETENT AUTHORITIES FOR AERODROME SAFETY

This area is one of the most interesting, but at the same time one of the most sensitive areas; and also one that will have a great impact on operational safety at Europe's aerodromes in future.

In summary one can say that in almost all EASA Member States visited the staffing levels of the competent authority need to be improved, sometimes at large. The underlying problems may be quite different in the various countries and also depend on how the countries have assigned regulatory tasks and on the actual scope of responsibility. Some countries have completely excluded certain aviation sectors – for example recreational aerodromes – from the national aviation authority's scope of responsibility, while others have transferred the supervisory tasks to various regional offices or even private entities and associations.

Aside from the staffing situation, that needs improvement almost everywhere, the expertise of staff with respect to the latest and sometimes quite high demands of the technical and operational requirements and procedures is not sufficient in all cases. Among other things, regular and partially complex safety assessments require significant technical expertise and additional qualifications. These qualifications and the corresponding necessary training are not assured in all countries.

While uniform rules and requirements will be issued by EASA in the foreseeable future – at least for a part of Europe's aerodromes – so that the individual national authorities no longer bear the burden of rulemaking of those aerodromes, the national authorities nevertheless continue to be responsible for issuing regulations and overseeing the aerodromes that remain within their scope of responsibility. In addition they certainly will have to manage new and greater challenges to implement the future European rules in their countries, issue certificates, carry out inspections and audits and also establish demanding oversight measures.

This situation is aggravated by the following:

In almost all countries visited during the study the national authorities have in part been "subject" to comprehensive cost-saving measures and restructuring plans by their respective governments. Due to frequent redefinition of the state's basic functions and responsibilities, staffing is reduced or vacant positions are not replaced or tendered only internally – "in-house". The result is that both the staffing capacity of individual authorities, but also their technical background, is not always quite sufficient. Especially the latter is problematic in light of the fact that many of the new ICAO standards and the anticipated European standards call for great technical expertise, for example in the area of SMS.

It also cannot really be expect that the staffing situation at the national authorities will improve in the future. On the contrary, one of the consequences of expanding EASA's competence may even be accelerated cutbacks of staffing levels, since the perceived shift of national aviation responsibilities to EASA could suggest a lower workload at the national authorities— at least to the political level.

Beside that the different career paths and payment schemes between aviation industry and public service also play a great role in the aviation authorities' current and future staffing configuration. In many states, vacant positions were encountered at the CAA's due to a movement of labour into the industry, sometimes to a very large extent. That situation is also very unlikely to improve due to the better salaries almost always offered by industry.

A further aggravation can be seen even in the role and function of EASA itself.

On the one hand, EASAs' responsibilities are continually expanded. This leads to additional demand for staff at EASA's headquarters. Many members of national CAA's focus on that see very interesting opportunities both for their careers and in terms of remuneration.

Meanwhile clear qualification criteria for the staff in the national authorities are needed and planned within the new European legal framework. As such, qualification criteria are likely to be higher than currently demanded (no such criteria exist at all in many states). The public services' restricted salary options will limit the national authorities' chances of hiring the needed personnel —both in numbers and required qualification. Both the attraction of EASA and the industry may further thin out the manpower available for the national authorities.

It is imperative that these specific risks be countered within the framework of a basic concept for aviation-relevant regulatory and supervisory activities in 21st century Europe. The developments are very unlikely to change or to repent. The future legal framework has to include options and solutions for the foreseeable shortage of staff at national authorities' level. Many areas are affected—starting from additional needs due to new certification requirements and more detailed oversight procedures up to needed special skills for safety assessments, and the like.

Such problems already lead to very interesting solutions in some countries. In one country, the CAA relied very much on external support delivered by specialized engineering companies. Sometimes the authority has temporarily hired large numbers of staff to support certification and oversight tasks for one year and even longer. The airports also used the same model to bridge a staffing gap in that country. In some other countries, the airports were required to present a yearly or semi-annual report on certain of the airport's infrastructural conditions. Certain CAA accredited companies had to prepare and deliver that report. It was used to relieve the CAA of time consuming tasks requiring special skills. The concept of using accredited and independent neutral companies to support the authorities seems to be especially interesting. On the one hand, it still leaves control in the hand of the national authorities (for qualification, accreditation, task execution, and the like). On the other hand, it has already been successfully used at the European level (ANSP certification based on the European Single European Sky package).

1.5 HANDLING OF DIFFERENCES BETWEEN THE NATIONAL LEGAL FRAMEWORK AND THE ICAO ANNEX 14

In this area, it is on the one hand important which national concepts for the implementation ICAO Annex 14 was chosen on the other hand also the capabilities of the respective aviation authorities play a major role.

Initially, no discrepancies at all can occur with the direct application of ICAO SARP's in the form of a dynamic reference. The authorities can concentrate on monitoring aerodromes and implementing new regulations, if applicable. If direct problems occur at the aerodromes during implementation and if, for example the introduction of special new infrastructural regulations is not possible due to structural peculiarities, the authorities can evaluate the possible effects on operational safety and, if applicable, authorise exceptions on condition of special mitigation measures. In this respect they have sufficient free capacity to concentrate on those tasks.

For all other concepts of implementation of ICAO SARP's– implementation in a single national regulation or in several regulations – clearly established and structured processes from the authorities are necessary in order to guarantee the greatest possible compliance and a quick and proper implementation of new Annex 14 regulations. This only succeeds in a few cases. Although in many cases the authorities are following a basic established process in implementing new regulations, but this process is only rarely clearly structured and documented.

Apart from this, the implementation processes are in many cases very drawn out due to the associated legislative procedure and its political implications. Differences to Annex 14 frequently occur, even if they are limited period in time. In some cases the implementation always has to take place on the basis of very high level directives - formal decrees from the government or even parliamentary laws. These procedures per se are hardly suitable to guarantee prompt and proper implementation.

If Annex 14 SARP's are anchored in various different statutory national regulations there is frequently no clear overview over the degree and type of national divergence from or compliance with Annex 14. Lack of personnel and specialist resources aggravate this situation.

A very structured approach to such differences could be observed in only one case. The country needed to deviate from Annex 14 in a wide variety of topics due to national specifics in topography and meteorological conditions. Different national solutions had been developed, based on very detailed assessments, to assure sufficient operational safety levels. Those very sound approaches were developed despite the fact that the state itself had been operating the national aerodromes until quite recently and that a real, separate safety oversight activity had been established fairly recently.

This problem area will probably be solved by the uniform rules that the European legislator will enact on the basis of EASA proposals which will be based on ICAO Annex 14. However, the problem is that without clear knowledge of the current situation concerning the compliance of national regulations with Annex 14 there is no full overview about the actual situation at the aerodromes and their compliance with applicable regulations. Thus impacts on the national authorities and particularly the aerodromes, caused by new, clear and strict regulations cannot be ruled out.

Besides that, the future European rules will have to fill quite a few holes that exist in Annex 14, either from rules missing altogether or from much of the content's merely recommendatory quality. Annex 14 also is not so detailed in requirements for aerodrome operations.

1.6 AWARENESS OF THE CAA OF DEVIATIONS FROM REGULATIONS AT AERODROMES

The general problem area has already been referred to above (see Capabilities of the competent Authorities for Aerodrome Safety, page 46).

Insufficient resources and capacities lead more or less automatically to an insufficient monitoring of standards for the existing aerodromes. New regulations cannot be implemented in a structured manner at the aerodromes and monitoring the actual condition of the individual airports is only possible to a limited extent or almost not at all. It could be very often observed that pre-existing, and sometimes certified/licensed, airports had been granted some kind of grandfathered rights for their infrastructure, meaning that new Annex 14 standards had not been mandatory for them. Those approaches very often lead to a complete lack of awareness about the deviations. Such concepts or ideas also will play a role in the upcoming European requirements.

In some cases the authorities have chosen interesting approaches to compensate the deficiencies in staff through special oversight concepts. For example, structured and standardised self assessments are required from the aerodromes which may ask to summarise relevant infrastructural and operational circumstances in a certain verification procedure. For this purpose the airport is obliged, for example, to have special technically suitable evaluations of the infrastructure carried out by audit or assessment organisations. These are then reported to the authorities in the form of a survey report. Other authorities require that their aerodromes (or accredited companies) conduct complex ICAO Annex 14 "compliance check lists", which have to include all existing deviations as well as a prioritisation for their rectification with reference to their safety relevance. Yet other authorities send on an annual basis simpler "self assessment forms" that the aerodrome operator completes and signs and which are then sent with any possible technical explanations and photos.

In this way a significant part of the supervisory tasks of the authorities are negated and the responsibility is partly transferred to independent neutral organisations or the aerodrome operator itself. As for the already explained problems at national CAA level such a concept seems to be at least interesting.

Some deficiencies could be identified during the interviews regarding the awareness of the CAA's and aerodrome operators about existing aerodromes' deviations to ICAO Annex 14 SARP's (e.g. aircraft in runway holding position infringing the approach surface, mandatory instructions signs on only one side of taxiways, runway guard lights not installed). The main reason for not being aware of such deviations is the lack of systematic practices (check-lists, inspections) to verify in detail the compliance of the aerodrome to current ICAO Annex 14 SARP's.

Overall, it can be determined that this area represents a critical point within the context of the study. It was determined many times that good and very good concepts are established at the aerodromes for dealing with possible deviations but that the authorities themselves did not have any comprehensive and sustainable level of knowledge about the current national situation.

The topic is also very much based on the general communication (and safety) culture in the same state. Where communication between authority and operator was open (and safety minded), knowledge and defined solutions could also be regarded as satisfactory. Establishment of very open communication and a good, general culture of safety must be granted a high priority.

The question concerning publication of actual deviations in the respective AIP was not satisfactorily solved everywhere either. There was uncertainty about the type and extent of the required publications in many places—questions like safety relevance and information needs were seen as problematic. Airport, CAA, and ANSP responsibilities were not clearly spelt out either.

Detailed and sufficient rules in the future rules are essential for all those topics.

1.7 HANDLING OF AERODROMES' DEVIATIONS FROM REGULATIONS

Also here the statements already made above can be reiterated. A sufficiently clear concept and structured regulations for treating existing and, if applicable, unavoidable aerodrome deviations from the applicable safety standards can only be established if the authority has extensive knowledge about the type and extent of the discrepancy and has extensive technical ideas about evaluating such discrepancies.

This area is of particular relevance, because the pre-condition of a high level of operational safety is a structured evaluation of discrepancies with reference to their negative effects on operational safety. Without knowledge of the effects no sufficient and suitable mitigation measure can actually be established and overall, no really high level of safety in the community's aerodromes.

Besides that, the already mentioned qualification of the staff involved—-either at aerodromes and the authorities—-plays a major role here. Missing knowledge can lead to unnecessary restrictions for the aerodrome; it also can lead to insufficient or no safety assessments at all with a massive reduction of operational safety for aviation.

As a basic principle it must be stated that in many countries good and also very good procedures have been established in order to evaluate the existing and known deviations at aerodromes and, if applicable, to authorise them under certain conditions. In some areas however, optimisation potential due to certain shortcomings has arisen that will be described in brief below. The causes for this are extremely varied.

The employees of the authority frequently barely have enough resources to systematically record all existing deviations and to process them. In many cases specialised expertise is also missing. Several problems are the result of this:

1. No clear and sufficient guidelines are issued by the authorities for the necessary safety assessments.
2. Therefore safety assessments at airports are carried out only to an insufficient extent and depth. The aerodromes (correctly) point to the absence of clear rules and guidance or complain about the absence of legally binding rules.
3. If the airports or also the authorities assign external service providers to prepare such safety assessments the authorities sometimes lack the technical expertise to judge the results and also the methodology selected. The conclusions that could be made are, in some cases, not "firm", cannot be implemented in part and are perhaps not even sufficient in terms of operational safety.

In many cases the question of how deeply the deviations that exist have to be evaluated is also unclear. Thus, although safety evaluations were carried out in the past and measures were also taken, the relevance of these deviations and the adequacy of the mitigation measures have often not been reviewed again for a long time.

2 HORIZONTAL ANALYSIS OF THE CERTIFICATION OF AERODROMES

Gap analysis (authors' opinion)

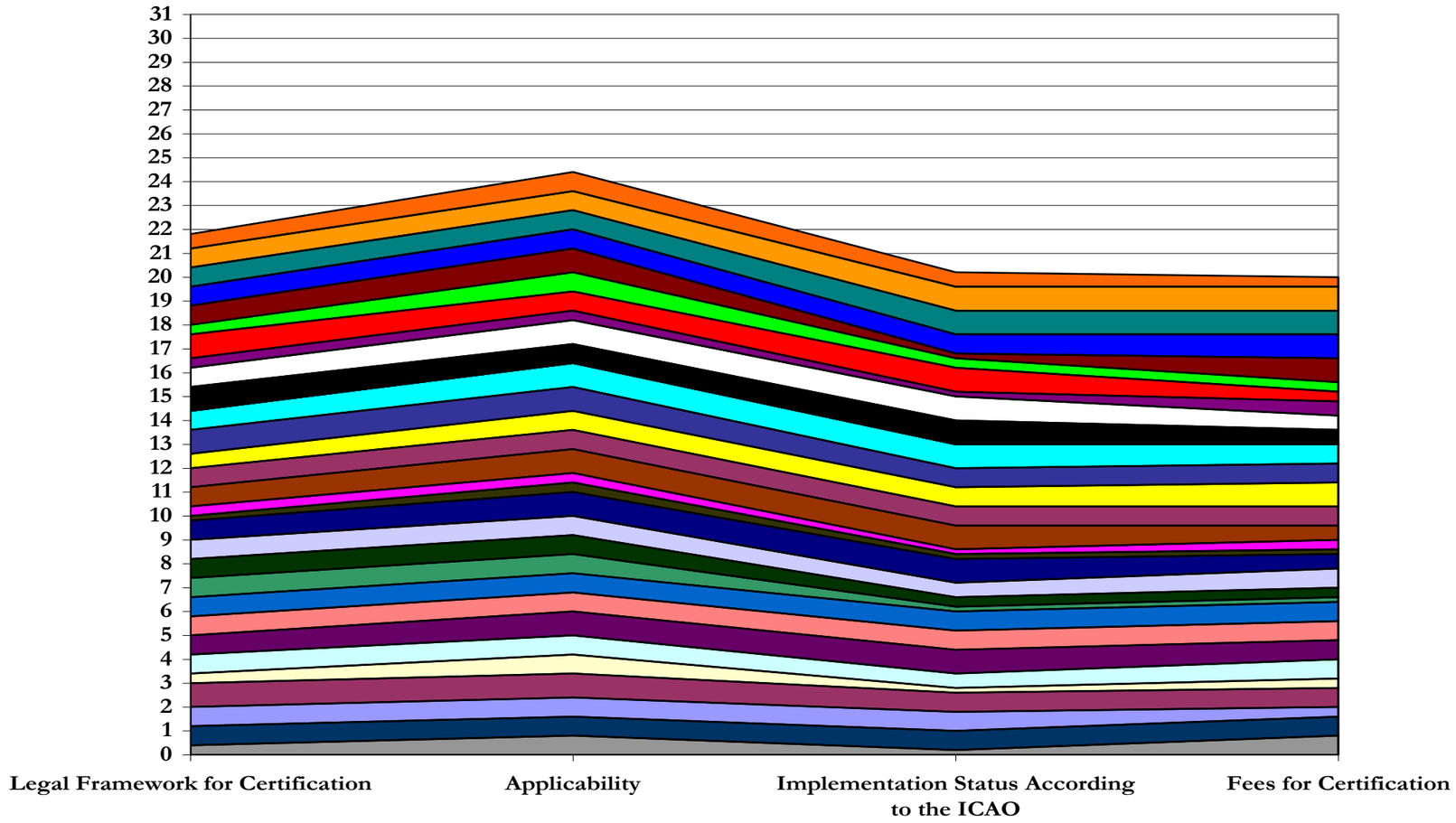


Figure 28: Gap Analysis "Horizontal Analysis of the Certification of Aerodromes"

Note:
Please directly refer to **1 Horizontal Analysis of Legal Framework and the competent Authorities for aerodrome safety, p. 42** for detailed explanation of the methodology used to perform a horizontal analysis.

2.1 INTRODUCTION

Within the context of this subject area the respective peculiarities and details of the approval and certification procedures in the individual states are presented.

What was surprising is that a number of states had only established structured approval processes for aerodromes a relatively short time ago (some even had not started yet at all). The corresponding certification standard of ICAO Annex 14 of the year 2001 gave rise to the first effective reason to optimise the either rudimentary or to even establish for the first time a totally non-existent approvals procedure. Such situations could very often be observed where, until recently, the state played both roles—-operator and authority—-without a necessary separation. In such cases, certification was very often a young and underdeveloped area of expertise, as was the structured oversight activity among the several operators.

Those recent members of the EU that have only been independent at all for a relatively short time had an advantage here. They could orientate their certification procedures after setting up state administrative structures, straight away on the ICAO requirements.

However, in many states, complex approval or certification procedures for aerodromes had already been long established. These approval procedures were sometimes even more complex than the ICAO regulations. Often in these cases, just some new, additional procedures and requirements (Aerodrome Manual, SMS) were introduced after the enactment of the ICAO SARP's in 2001, because existing procedures just had some gaps.

2.2 LEGAL FRAMEWORK FOR CERTIFICATION

As has already been presented under the chapter Adoption of the ICAO Annex 14 into the National Legal Framework, page 44), the time frames for the introduction of a new ICAO regulation into national aviation legislation are partly very different. Depending on the type of rule to be amended or enacted (e.g. Act or Ordinance) or the necessity of a completely new authorisation basis it took several years to implement.

The states that had already established comprehensive licensing procedures and that accordingly did not have to introduce a new procedure found them in a comfortable position. Merely small complementary measures to the existing regulations were added, otherwise ICAO was shown that these standards were fulfilled.

The necessary supplements to national approvals pre-conditions mostly only affected the following:

a) The introduction of the Aerodrome Manual required by the ICAO;

b) The introduction of the Safety Management System required by the ICAO.

In some other states "ICAO Certification" was introduced in addition to the already existing approval procedure.

The real need for this could not really be comprehended in all cases because an adjustment of the already existing procedure would have been sufficient. In these cases the introduction was mostly justified, firstly because the national procedures do not cover all areas of "ICAO Certification", such as airport management and aerodrome operation, and had been limited only to infrastructural questions.

Secondly, all these steps were very often justified in that the new "ICAO Certification" would grant the authorities a new and additional possibility to oblige aerodromes to accept new requirements and also to establish a new quality of monitoring aerodromes (without great political and rulemaking difficulties). The new ICAO SARP's on SMS were therefore used as an instrument to compensate for deficits in the national authorisation of the authorities, but also to be able to bring insufficiently focussed aerodrome operators "into line".

That approach was often used where the national authority had been established quite recently as an independent oversight body whereas the aerodromes still were operated from one source—-mainly a state-owned entity which was often also the national ANSP with corresponding political powers. This shows that in some cases political pressure and the possibilities of political influence exercised by large airport operators is not to be underestimated and that the aviation authorities may have difficulties of leverage in this environment.

In other states no approval procedure existed before the new ICAO requirements were enacted. Establishment of an adequate legal framework for certification was difficult and drawn out due also to the authorities' insufficient general empowerment.

In those counties this led to no certification at all being carried out in some states, officially at least, because the corresponding regulations were still in the legislation stage. Thus – in order to have a type of official permit – preliminary formal certificates were issued, although no corresponding legal authorisation basis existed, no procedural regulations had been enacted and also no certification procedure had been carried out. It must be stated, however, that the cause of this could not be uncovered in every case, despite the authorities having strongly demanded the introduction of the corresponding directives. Mostly it concerned procedural and political problems that could be found in national legislative procedures, for example, that are subject to very strong political influence. In some states a change in government caused a change of all senior members of the government and that of the direct head of department level too, which did not exactly encourage continuity in the work of the authorities and in legislation procedures.

In these states the first steps to implement the ICAO requirements were taken at a more "voluntary" level, to compensate for the difficulties in enacting the regulations. Thus, at the "suggestion" of the authorities the first drafts for individual Aerodrome Manuals were prepared by the aerodromes and also the first steps to implement at least the basic standards for SMS were initiated.

Although enacting the corresponding regulations at the European level for at least some of the aerodromes can satisfactorily regulate this area in future, the impact that structured approvals and monitoring standards will have on the states is not to be underestimated. Besides experience with structured certification very often missing-—both at aerodromes and authorities-—the alignment to the existing national licensing procedures will be a great task for the states. Moreover, missing oversight capabilities at the national authorities will also further aggravate the situation.

In conclusion, it can also be summarised that the individual national solutions, the advantages and disadvantages and the problems of the authorities and aerodromes were very different.

2.3 APPLICABILITY OF THE CERTIFICATION REQUIREMENT

The range of the aerodromes certified by the national procedures was very broad. Provided that the state had established an approval procedure at all, sometimes all aerodromes and sometimes only those directly required by ICAO were certified.

In particular, the states that had introduced "ICAO Certification" in addition to already existing national procedures only decided on a limited application of this certification. The range of application was frequently determined on the basis of a risk-profiling of the airports. Accordingly, (additional) certifications were required, for example for:

- All aerodromes with IFR traffic
- All aerodromes accessible to public traffic
- All aerodromes with commercial traffic.
- All aerodromes with IFR traffic and/or commercial traffic and aerodromes where flying schools are based.
- Basically all aerodromes existing in the country.

In the states that have long established approvals procedures and that therefore did not need to introduce a new and additional ICAO certification procedure, mostly all aerodromes are subject to the national approvals procedure.

2.4 IMPLEMENTATION STATUS OF AERODROME CERTIFICATION ACCORDING TO ICAO

As a matter of course the advantages and problems that have been presented above affect the implementation status. The states that had already established approval procedures also have a high, mostly one hundred per cent implementation status. Open questions remain merely on some issues such as the status of introducing SMS etc.

In the states that additionally introduced "ICAO Certification" after 2001 the implementation status is very different. If the establishment of an appropriate national legal basis, authorisations and procedures was difficult, then partly only the first, basic steps have been fully implemented. Some states have not even begun to carry out the certification but have at least a structured plan for defined implementation phases.

In some states nothing has been done at all to implement the ICAO regulations. This is mostly due to political-legal problems that have hindered the introduction of a proper and sufficient legal basis up to today.

2.5 FEES FOR CERTIFICATION

In this point the range of different national concepts is also very broad. It ranges from purely administrative fees that include no or hardly any cost related elements, to complete fee systems in which the authorities calculate clearly on the basis of the man-hours or man days and invoice fixed fee daily rates for this. There may also be a charge for the continuing oversight of a certified aerodrome.

Mixed systems are very frequent. They contain a fixed annual contribution from the aerodrome for certification and oversight and possibly approved supplementary fixed payments for further, additional and unplanned activities e.g. per inspection, or accounts are issued related to the time and effort actually made. In some cases fixed payments also have to be paid for annual oversight. Although these amounts are determined on the basis of cost related planning, any additional visits by the authorities that may be required cannot be separately invoiced.

A very unique fee concept could be observed in one state:

The national CAA basically relies on a standard fee for certification. Besides that, an additional fee for oversight of the aerodrome's activities has been established. The first part follows a common approach---listing fee amounts in relation to the aerodrome's code letter. In contrast, the latter fee is associated with the aerodrome's operational size. The relevant national rule states that, among other things, an airport of a certain operational size has to pay oversight fees according to rising traffic volumes. Even more interesting was the fact that such fees are collected within, or as part of, the normal passenger ticket fees. The CAA explained that the fee system allows for a fully self-financing entity.

In every case the range of national solutions to the fee question is wide and approaches that really cover real costs are rare. Thus, on the one hand a considerable impact would be expected on the individual states if a fee system was introduced in an appropriate way. On the other, precisely this impact has to be very closely observed because political and fiscal questions are at stake. As part of this study, some of the authorities have even pointed out that the additional costs that may be incurred by introducing ICAO certification would be a significant source of friction. That area of responsibility is much influenced by national solutions and political influence. However, the needed elimination of many existing disadvantages is connected at least partly to an adequate fee system. However, there are no plans that the European rules will require or even touch upon the fee schemes for aerodromes certification.

3 HORIZONTAL ANALYSIS OF THE SAFETY MANAGEMENT SYSTEMS

Gap analysis (authors' opinion)

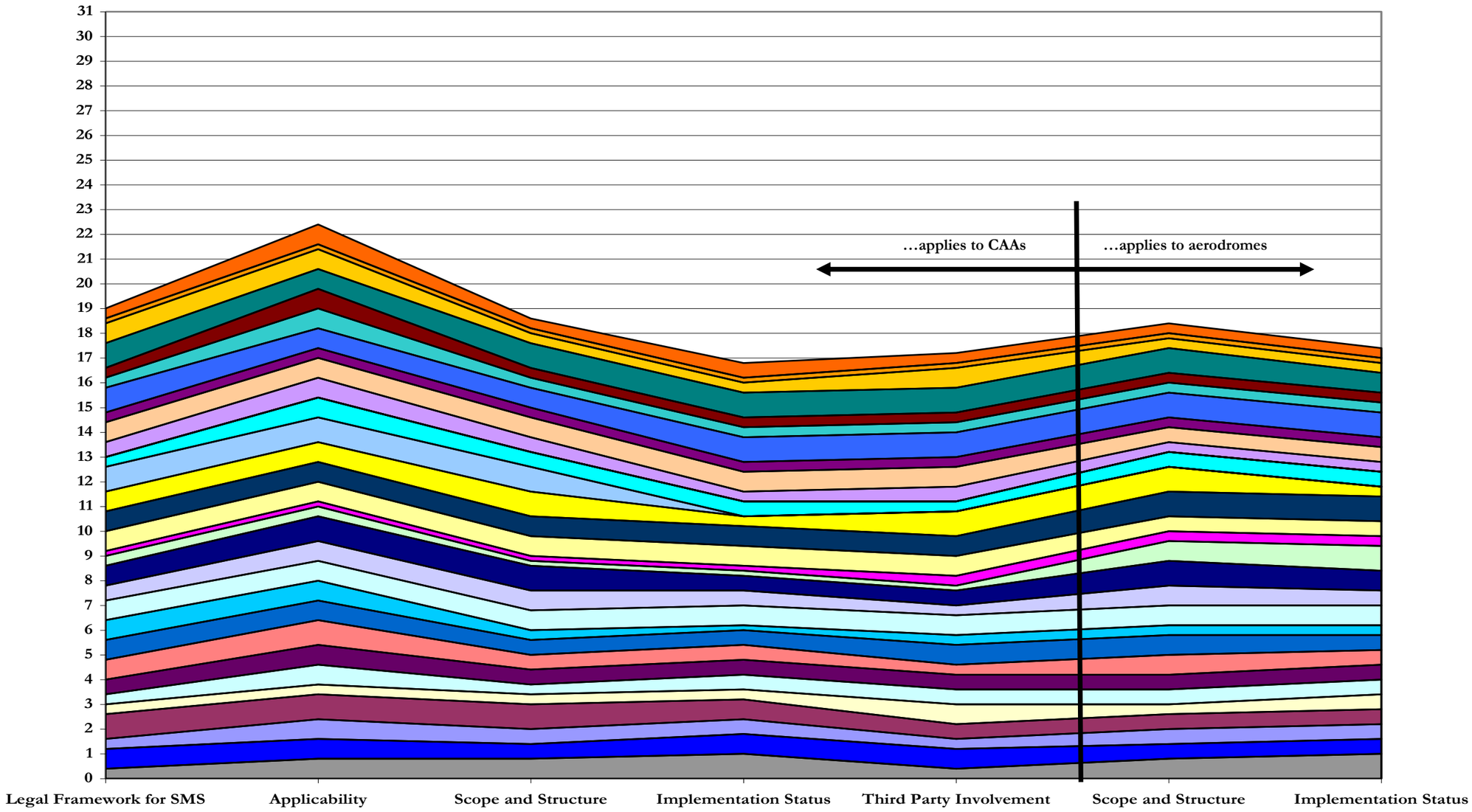


Figure 29: Gap Analysis "Horizontal Analysis of Legal Framework and Competent Authorities for Aerodrome Safety"

Note:
Please directly refer to **1 Horizontal Analysis of Legal Framework and the competent Authorities for aerodrome safety, p. 42** for detailed explanation of the methodology used to perform a horizontal analysis.

3.1 INTRODUCTION

The implementation of ICAO Safety Management Systems (SMS) requirements represents the area that makes the most demands on the authorities and also on the airports.

On the one hand sufficiently accurate and detailed standards have to be adopted in order to guarantee adequate introduction of SMS at airports. On the other hand, the authorities ideally have to draw up additional guidance material in order to supplement the at times inadequate international regulations and details so as to guarantee quick and comprehensive implementation. The airports themselves have to define technically suitable responsibilities and at times have to carry out considerable investment in these tasks.

Alongside the formal, general but challenging steps, both the authorities and particularly the airports too have to accept considerable changes in the expected safety culture and implement it at the airports. The best example for this is the necessary introduction of "voluntary and non-punitive reporting systems" at airports. The system includes completely new ways of involving employees that are very difficult to establish at almost every airport and may meet resistance from the board and senior airport employees. The authorities have to accompany and monitor the implementation of the systems at the airports very intensively. Authorities also have to develop new and at times complex know-how in order to offer the airports sufficient support for the upcoming new procedures and also to be able to meet their oversight responsibility for SMS.

If one of the players named in this system is not or only insufficiently prepared for these tasks the whole implementation process will fail or will at least be considerably delayed.

If clear legal obligations for the aerodromes come too late the boards of directors, particularly in challenging economic times, will find it difficult to release the necessary investment. If there is insufficient further education and possibly external support, the implementations will fail due to a lack of awareness of the problem or missing expertise. If the relationship between the airports and the authorities responsible is not open and cooperative, or if the authority's staffs are unsuitable to guide the airports, the implementation will fail due to the absence of a safety culture or structured monitoring.

All in all, at least in the start phase, the concerned authorities face important challenges to make the national implementation projects in this area successful. However, with reference to the existing restrictions reference is made to this topic under the chapter: Capabilities of the competent Authorities for aerodrome safety, page 46.

Besides those topics, it must also be considered that the SMS at airports also has to reflect the influence of third parties like ANSP's, airlines, ground handling providers, and the like, at the airports. On the one hand, it is a common risk environment; on the other hand, requirements are also needed for third parties, and such requirements should be very well aligned with the basic principles of the requirements for the aerodrome operator.

In some cases, the aerodrome operator is also a certified ANSP. The current set of international and European rules does not reflect such identities. Any risk management system like SMS should involve all existing stakeholders. More importantly, the aerodrome organization should act as the leading stakeholder since the aerodrome is the physical risk environment in which all stakeholders must operate and cooperate. In many of the states visited, the aerodrome organisation already subcontracts the ANSP, or is an ANSP itself. Any subcontracted relationship should meet or exceed the requirements of the leading stakeholder. Risk management should remain consistent, particularly where common risks may be involved.

Overall, this area is interesting in relation to the expected impact of the new European rules on airports and authorities. At the same time it also makes considerable demands on the proportionality and quality of these new European rules. According to the general expectations and experiences of the past few years, SMS should be one of the central tools for increasing safety in the aviation sector as a whole. As the central intersections for all aviation users and operators, aerodromes are an extremely important – if not the most important – component of this network.

In this section firstly the situation from the point of view of the aviation authorities is considered. For this purpose, the available legal framework will be estimated and the authorities' implementation concepts will be presented. Following this, the situation at the visited airports will be described.

3.2 LEGAL FRAMEWORK

With regard to the existing legal framework extensive reference can be made to the remarks for the aerodrome certification process.

In all cases, the implementation of an SMS is required for the issuance of am aerodrome certificate. The SMS's scope of applicability has been wider than the certification's scope in only one case (SMS for all aerodromes with public use, certification only for international commercial scheduled traffic, IFR and flight schools).

Countries which already had long established adequate approval or licensing procedures amended their national standards to compensate for the deficient elements and procedures (in most cases just SMS and aerodrome manual) and they have, within the scope of ongoing oversight activities, requested the appropriate action for airports. In some countries these standards and procedures were already established at least in principal. These countries have already implemented the essential parts of the standards and procedures in the domain of SMS even before the issuing of the relevant ICAO standards, or they have administrated the corresponding, complex aerodrome documents.

On the other hand, in countries where the framework conditions could not be found or where they have only the essentials of a legal framework, standards dealing with SMS naturally play a lesser role and are definitely insufficient.

3.2.1 SUITABILITY OF THE SPECIFICATIONS

Except for a few cases, the national standards are mostly confined just to the duty to implement an SMS. Only very rarely the national rules mentioned essential SMS components – or even more – state of the art SMS requirements.

For this reason, it is not wrong to make the general statement, that most of the existing national standards are not sufficient in ensuring a comprehensive and structured implementation of SMS at aerodromes. The standards corresponding to SMS are very basic and only give general specifications for the most essential topics. They do not represent comprehensible guidance and implementation material. Even the corresponding guidelines and information in the ICAO Document 9774 and in the Safety Management Manual are not really comprehensive instruction manuals for the implementation of an SMS at an airport. Above all else they do fail to provide any clear indications for how differently sized aerodromes with different structures and complexities of traffic can be dealt with.

In this respect, even countries, where Annex 14 is directly applicable (by the concept of dynamic referencing), are only marginally better off. On the one hand, the formal legality is not absolutely clear; meaning, whether or not the general validity of ICAO Annex 14 also extends to additional manuals beyond the Annex. On the other hand these manuals are not detailed and sufficient enough.

In conclusion it can be summarized that there is a considerable need for clear, detailed and proportionate specifications regarding SMS aerodrome standards. This need also indicates the expected high impact on authorities and airports when new and sufficient European standards will come into effect.

Again the special need to have common rules for all stakeholders must be stressed. Aerodromes very often have shared roles - aerodrome operator, ANSP, ground handler, and many third parties have to be integrated into the airport's risk environment. Where requirements for an SMS are defined, they should ensure that an organisation providing aerodrome operations and air navigation services does not have to address two differing sets of SMS requirements. One organisation should have one SMS. Similarly, two or more separate organisations within the same aerodrome risk environment should not have differing risk management systems and therefore should be addressing common SMS requirements. Common risks must be identified and managed within these environments. Multiple approaches to managing the same risk represent an additional avoidable risk. Even more importantly: If there are subcontracted services within an aerodrome risk environment, then all such services must be required to comply with, or to be integrated into, the SMS of the organisation bearing overall responsibility for the aerodrome's safe operation.

Besides that, the future rules and guidance material also have to acknowledge the fact that more and more integrated management systems are implemented at aerodromes. The specifications should allow for such solutions. The specifications also should take into account special solutions (or flexibility) for large aerodrome operators, which sometimes operate a large number of different airports. It could for instance be observed that some of those operators do have a centralized a SMS concept where some staff are used at different locations—meaning airports have a "shared" SMS manager.

3.3 APPLICABILITY

Regarding the range of aerodromes obligated to implement an SMS, the same applies as outlined at the topic of aerodrome certification. In nearly all cases the implementation of an SMS as a condition for certification is requested, so all certified aerodromes are at least theoretically obligated to implement and operate an SMS.

The scope of aerodromes requested to implement and operate an SMS differs from country to country. Examples seen in different countries are such as:

- All international aerodromes and all aerodromes having IFR air traffic;
- All aerodromes having IFR air traffic;
- All aerodromes , which are open to public use;
- All aerodromes having IFR air traffic and aerodromes at which flight training schools are based;
- All public aerodromes.

3.4 SCOPE AND STRUCTURE

Only some countries took steps to implement SMS long ago. Only such countries have had the chance to develop detailed SMS regulations and guidelines for their airports. For smaller aerodromes in these countries, depending on size, traffic and complexity, tailor-made solutions are sometimes implemented as well.

In one country, a country-wide project was initiated for the formulation of common standards and procedures for SMS implementations at aerodromes. This was done by the authority responsible for rulemaking through a closed cooperation with aviation research institutes and certain national aerodromes. The standards compiled from this have been used by several airports and were also frequently used across the country's frontiers. The only disadvantage was that the results of that project were not formally enacted as mandatory standards, which somewhat restricted their full potential.

3.5 IMPLEMENTATION STATUS

With regard to the status of the implementation of SMS, a very heterogeneous picture can be seen.

From the viewpoint of some authorities, the necessary implementation steps are mainly performed, which is acknowledged as a satisfactory result. Such estimation very often is made just on the basis of a self statement of the airport, not followed or supported by a formal inspection or even real detailed audits of individual SMS components and the organisation. The authorities' lack of staff (and competence) again played a major role here. Very often just the information about a designation of the Safety Manager and the confirmation that an SMS manual has been compiled is taken for granted. More in-depth checks on the SMS, for example on the establishment of a reporting system or the carrying out of systematic risk assessments or internal audits, do not take place.

Often there are no detailed implementation specifications other than those that just stipulate that an SMS is required. The implementation measures required for aerodromes then are correspondingly (less) detailed and comprehensive.

In countries that have already concerned themselves long ago with the implementation of these systems, standards are already in place, which are more developed. Accordingly, the situation at the airports is a better one. Despite this, statements from the authorities and the airports clearly state that even in such countries still significant steps are required to really be able to speak of a successful SMS implementation.

The situation presents itself even more difficult in those countries that have not yet issued any clear guidelines in the area of certification. A regulatory framework is non-existent, and in many places the implementation status reached is more based on the initiatives taken by aerodromes themselves than due to ongoing support and guidelines from the authorities. What also has come to light is that in many countries, aerodromes have undertaken further, and more well-defined implementation measures despite inadequate guidelines from the authorities, mostly due to their own raised awareness. Such advantages rely more on industry-specific information sources and bodies such as the Airport Council International (ACI) Technical and Operational Safety Committee (TOSC), which are responsible for spreading "best practices" and basic standards.

It can be summarized that only in a few countries a sufficiently highly developed implementation status of the aerodrome SMS concept exists. Although satisfactory progress has been achieved in a few countries, further measures are necessary.

In the majority of countries visited, not only do the existing national rules leave much to be desired; also the individual practical measures undertaken by the aerodromes are also lacking. The delivery of just formal prerequisites – appointment of a safety manager, submitting of an SMS manual and the presentation of a safety policy – is equated with adequate implementation. Real validation is ensured only inadequately if at all.

This can partly be ascribed to a lack of real awareness by aerodromes of the need to implement a SMS and also resources not being made available. However, that problem cannot simply be resolved just with explicit new legal rules and enforcement, since on the one hand the authorities' oversight capabilities are inadequate in many countries, and on the other, the qualification of the aerodrome's staff and the focus of the aerodromes' management are very often not given either.

Clear and detailed European rules will therefore have a very sizeable impact. Not only will they have an impact on the authorities, but also on the different aerodromes and therefore must be evaluated extensively because of Europe's diversity.

3.6 THIRD PARTY INVOLVEMENT

Basically, the same statements apply as already above and made in the part Legal Framework, page 55.

Only in rare cases have legal provisions been issued, to which independent third party companies and organisations at the aerodrome are subject to, either to participate in the Aerodrome SMS or institute their own compatible safety management systems. In many countries the aerodrome as such has indeed been officially obligated to incorporate third parties over and above its general duty to provide safe operations. Yet the contractual and formal questions thus emerging from that approach are not always sufficiently resolved.

In several states, the authorities – mostly prompted by the European ground handling services regulations – have developed separate certification procedures for ground handling services. In part, these also entail guidelines for operational safety – for example for the implementation of an SMS or for integration into the Aerodrome SMS. Associated with this sometimes come very substantial enforcement measures the authorities can use in cases of insufficient compliance by such a company.

To a large extent, the integration of independent third parties into the aerodrome SMS is regulated ineffectually and not implemented sufficiently. A small number of corroborating examples have been identified which possibly can be used as examples for the rules needed here.

The impact of new and sufficient European rules will be considerable. On the one hand they will demand that resources be made available for organising the integration process at the aerodromes, on the other hand, concepts need to be developed that will guarantee ample capacity for monitoring the third party companies. In most countries the aerodromes and the authorities will not be in a position to implement a sufficient level of surveillance. Again, concepts are needed to compensate for the national authorities' staff shortcomings (see Capabilities of the competent Authorities for aerodrome safety, page 46 above).

3.7 IMPLEMENTATION STATUS OF SPECIFIC ELEMENTS OF SMS

Details on the single components deemed necessary from the authors' perspective for a comprehensive and operating aerodrome SMS are described below.

The below shown explanation include on the one hand details on the contents of the respective national rules, and on the other hand also the status of the implementation of the certain components at the visited aerodromes will be outlined. To achieve a comprehensive overview and quick access and understanding, the respective remarks were made within the framework of a summary matrix.

In so doing, the fundamental guidelines of the ICAO as broadly outlined in Annex 14 were deliberately not used as the only basis. From the author's perspective the Annex 14 elements would have only provided an incomplete picture of the aspects and processes required for an SMS in reality. Many of the general and explanatory formulations by the ICAO had to be broken down into concrete operational and management guidelines and tasks, in particular to be able to provide to the aerodromes clear and individual steps needed in reality. Experience has shown that also for the authorities, the content of Annex 14 is not sufficiently precise to develop national guidelines from them. The following matrix describes in more detail certain problems which occurred for individual SMS elements. The explanation is divided in two sections – the left column describes the legal side: Is there a clear rule on that topic? Are there missing details or unclear responsibilities in the existing rules? The right column addresses the actual real status of the implementation of the element at the aerodromes visited and describes in more detail some of the still existing problems. Indication is given where special attention is needed while developing the new European legal framework for SMS at the aerodromes.

Certain Aerodrome SMS Elements, Implementation Status & Lessons Learned

Example	
SMS ELEMENT	
On the left side of the matrix the rulemaking or legal status of the specific SMS element is explained	***On the right side the actual status of the implementation of such SMS-element at the aerodromes is explained***

Safety policy	
• This element is legally required in the majority of the visited countries, only the states with no respective legislation at all do also not have that clear requirement; • **Problem:** Only very few national rules contain the necessary details for a safety policy, such as the necessary content, the declaration of a no-blame-culture, the need for a non-punitive reporting-systems etc. Special attention is needed to make sure future European rules do contain such standards because they will form the base for a better safety culture. Without clear, comprehensive and binding policies a developed safety culture cannot be accomplished. • Pls. note that such policies also might be useful for the national aviation authorities itself (maybe as part of the state safety plan, including safety data protection etc.). They have to be integral part of the system and have to share a high safety culture • Very often it is also unclear who has the duty to sign the policy – sometimes it's the individuals' aerodrome manager, sometimes the head of the traffic department, sometimes the CEO of a multi-airport operator.	• In general a safety policy is part even of just basic SMS documentations the countries visited; • Not all of the policies seen did include the needed details, very often it was just a basic declaration without clear management commitment, explanation of certain elements of the SMS and binding company rules. • Differences exist in at the aerodromes regarding the status or position of the signee of the policy, e. g. sometimes it is not the CEO but a lower management position. Often only the signature of the CEO of a large airport operator (headquarter) was observed whilst the local airports manager did not have to acknowledge the policy at all. Thus the establishment of a good local safety culture gets harder. • In the majority of the visited countries even good safety policies are not fully communicated and enforced to the local aerodromes' staff; especially where needed safety investments or the principle of the priority of safety are concerned. Full and real management commitment and involvement was rarely observed. • In most countries strong improvements are still necessary with regard to a needed safety culture; a good and well communicated policy (and the commitment of the management) is the basis.

Appointed Safety Manager	
• In most countries the designation of just some responsibilities (a person or a department) for the SMS is required within the national rules. That indeed allows for flexible local solutions at the different aerodrome; however, it also allows for insufficient approaches where responsibilities are only partly taken care of. • Very often the tasks and responsibilities of such person or department are not defined. • **Problem:** Only in one case a guideline for the size of the SMS staff could be observed. In all other cases no minimum staffing needs for SMS at aerodromes of a certain size are described. The future European rules should include guidelines for the minimum staff level necessary to perform the required SMS tasks. Therefore a system of defining different sizes of airports and respective SMS needs to be developed (e.g. operational numbers, pax, movements, number of employees, number of independent third parties at the airport). • Sometimes a legal requirement could be observed to publish the designation of the safety-related position(s) in the certificate or in the aerodrome manual. • The need for details on the necessary qualification of a Safety Manager or a person in charge could be observed during the study.	• All aerodromes which stared to implement SMS also had a appointed person or a department in charge. Very often that responsibility was only part of the job description of the man in charge (manly at smaller airports). • The flexibility of many national rules lead to different solutions: some airports worked on the base of total central accountability (one man, one department) whereas others divided the functions and tasks within the SMS between different persons/departments and sometimes allocated the tasks widely within the organisation. • Where no centralized approach was followed, different SMS tasks e.g. audits were done by different parts of the organisation (audit department; documents were administered centrally, safety assessments performed as cross section function). • The de-centralized solution has particular advantages from the perspective of integrating the entire aerodrome management and the staff; information is disseminated more easily and an inevitable awareness of one's own role and responsibility in the SMS is given a boost. • Interesting solutions could be observed again at major multi-airport-operators. Besides the sharing of positions (one SMS manager for more than one airport) also centralized offices at headquarter level could deploy specially trained personnel in case of need. Beside that also centralized audit teams and standardisation issues very much lightened the burden of the single airport staff.

Safety management documentation (Safety Management Manual)	
• In most cases fundamental documentation is called for although the requirements for the details differ vastly. Very often just the requirement of a SMS manual could be observed whereas no details on content etc. have been mentioned. • What has frequently been enforced is the integration into the Aerodrome Manual although some authorities tend to demand separate documentation. Also here a clear guidance on document structure seems appropriate: easy comparison, best practice sharing etc. are easy done and the assessment for the authorities is much easier. • The demands made for nationwide standardisation of the document also do vary. Some authorities put the decision on type and execution in the hands of the aerodrome to a large extent, few others did demand adherence to a uniform structure of the manual. • <u>The future European rules should at least give basic standardisation for the structure and content of documentation at aerodromes, although the content has to be developed and customized for the individual airport the structure should allow for quick comparison and assessment.</u>	• Even in the case of aerodromes for which the authorities have not yet issued any clear guidelines for various reasons, at least some basic documentation and memoranda of the first internal guidelines are available. • The very basic legal requirements left much freedom – that lead to sometimes very different solutions at the different airports. • Even well developed documentations had minor disadvantages with regard to e.g. details concepts and procedures for safety assessments etc. • Many benefits could be identified when a nationwide standardisation was done (either because of a major operator who operated the majority of the national airports or where the CAA took a leading role and did clear standardisation): such standards allowed for fast comparisons and assessments), they also allowed for exchange of information between different aerodromes, the implementation itself was much more efficient and faster. • The best examples relied heavily on digital content management systems and specialized software tools which also eased the distribution of the documentation and the safety communication

Non-discriminating and anonymous internal reporting system	
• The legal requirements on that topic are very often very thin. Especially in states where no clear rules on SMS have been adopted authorities and airports only relied on the "normal" mandatory reporting scheme (based on duty reports, only covering accident/incident data, no pro-active approach to reporting). Even such data was sometimes only basically collected and assessed; even the existing reporting needs improvement. • There were hardly any state with the clear legal guidelines needed for topics such as guaranteed anonymity; no blame culture etc. details on the need and depth of the investigation of reports rarely could be identified. • In contrast to this, four of the authorities visited had introduced countrywide reporting systems, which were virtually accessible to everyone and which ensured that the authorities were informed of possible preventative measures immediately. • Good guidelines based on clear legal rules are more than necessary to assure a sufficient and necessary foundation for that element. The need for proactive approaches and very standardized concepts based on a excellent safety culture (which is pre-condition for good safety reporting)	• Very seldom were comprehensive systems found, in which all concerned were informed and that were also used intensively by aerodrome staff. Mainly these systems also relied on software support. • In many countries basic reporting structures were available, although these were not fully used all over. This could be ascribed to either inadequate communication regarding the implemented reporting systems or insufficient accessibility. The basic reporting schemes also mainly relied on the mandatory information which already had been gathered at the airports. Extracts from duty reports were used to start with some basic reporting collection, real SMS-reporting was still far away. • The greatest flaw was however found in the reporting structures themselves and with regard to the continued assessment of the reports, as well as the implementation of the conclusions and changes derived from these. • In the countries where nationwide systems have been installed also the investigation and assessment of such reports was enforced and lessons learned have been spread through the aviation community.

Systematic Hazard identification	
• In many countries only very general legal statements on that element did exist. Very often even just reference to the basic ICAO requirement for hazard identification was made. Only very rarely necessary details on how and when to do such assessments have been ruled out. • However, in very few cases do the authorities test in depth whether that component is clearly implemented or enforced. The assessment of hazard identifications done by some of the aerodrome are mainly very basic if done at all; proper and mutual development of mitigation measures was rarely found. • Only very few countries called for compliance check lists from aerodromes. Such national solutions required e.g. the record of any deviations from ICAO (Standards, sometimes also Recommendations); they also required the identification of all other possible hazards regardless of existing rule or not. Only in very few case the development of clear mitigation measures and timelines did exist. • The latter solution (record of <u>any</u> deviations from ICAO Standards <u>and</u> Recommendations, identification of <u>all other</u> possible hazards <u>regardless of existing rule or not)</u> could serve as best practice for the necessary new European rules on that topic. Nevertheless, it has to be kept in mind that such tasks do need sufficient staff, training and qualification, something which is very often missing at Europe's aerodromes.	• Mainly rudimentary attempts were frequently identified at the visited aerodromes, however upon closer examination these were often aimed only at the area of change management, where hazard inspections were introduced in the preparations for construction work etc. Very rarely the airports started more comprehensive identification projects and basic assessments. • In one country comprehensive compliance check lists and (included) sufficient hazard identification concepts were found. • In another country the major airport operator did make an attempt to collect all existing deviations, but failed to do a proper assessments. For the one hand the recommendations from ICAO did not get the proper and necessary attention, for the other hand the conclusions drawn for needed changes and time lines did not real meet the safety risk represented by the deviations. The list of actions to be taken was more based on financial questions and plans than on needs for operational safety. Beside that the list was not really assessed and questioned by the responsible authority; this mainly due to missing knowledge, time and questioning. • Very often airports aerodromes and also the authorities relied for many times – mainly when serious assessments had to be done – on the support from the national Air Navigation Service Provider or on external support by specialized companies

Risk assessment and mitigation	
• The same basic observations apply here as in the area of hazard identification, as seen above. Mainly just basic statements about the need to do assessments is given, details on how, how deep and clear guidelines are not available. • Often a clear statement by the authorities or a legal definition is missing when it comes to type, extent and content of a risk assessment to be implemented. • The role of the authorities in the evaluation and acceptance of risk assessments varies extremely. Rarely the authorities are integral part of such projects and define the scope and depth of the study. Very often they just get some more basic paper work from the operator; the lack of expertise very often leads to insufficient review of the results. • Often the authorities do not issue clear-cut approvals for assessments and aeronautical studies – sometimes on the grounds of lack in expertise, sometimes more due to liability topics. • <u>The need for clear guidelines on scope, content, concept and documentation for risk assessments and risk management became more than obvious during the course of the study. The new European rules also have to define the role and responsibilities of the national authorities in assessments.</u>	• The same observations apply here as in the area of hazard identification, as seen above. • Most activities are centred around basic risk assessments of upcoming construction projects and their potential effect on operational safety. Some studies have been done due to the introduction of new aircraft types to some airports. • Often the risk assessments are conducted very simply and purely based on an expert's survey or interview. • Very often – even when a sufficient assessment was done based on experts opinion – a huge lack of sufficient documentation could be observed. Decisions from the past cannot be reconstructed at all. • One country with very challenging terrain restrictions did develop quite comprehensive approaches to the assessment of unavoidable deviations: this could be used as an example or best practice. • Very often airports aerodromes and also the authorities relied for many times – mainly when serious assessments had to be done – on the support from the national Air Navigation Service Provider or on external support by specialized companies

Investigation and safety analysis capability	
• Clear legal guidelines and requirements which the aerodromes can use as a basis could almost nowhere be observed. The national standards mainly are limited to the basic declaration that safety reports should be assessed and analysed but no further details are made available. Basically just the general requirements coinciding with the text issued by the ICAO are imposed. • Here the problem of missing guidelines is just one side of the coin – the need for qualified personnel, systematic training and available staff represent the more demanding part. Beside the staffing issue which is and will be very problematic for the national authorities (limited wages, general budget limitations etc.) also general training and qualification needs have to be addressed.	• Aerodromes that have established structured reporting systems are for the most part also inclined to be focussed on a at least basic analysis and inspection of the problem areas detected. • In this respect a varied picture is emerging among the aerodromes visited, since the implementation status is vastly different in every country and aerodrome. • Very often airports aerodromes and also the authorities relied for many times – mainly when serious assessments had to be done – on the support from the national Air Navigation Service Provider or on external support by specialized companies.

Change management/ management of temporary changes	
• The respective ICAO guidelines in the SMM (Doc 9859) and in the manual on certification on aerodromes (Doc 9774) also do not contain clear and easily implementable guidelines on that component, in any case not with sufficient refinement. • Accordingly, the national guidelines and standards provided by the authorities are often only very basic and elementary; in many cases that SMS element is not even mentioned at all. • Almost never a clear guideline on when or what change to start structured safety assessments could be observed. • <u>The new European legal framework for the aerodromes must at least include basic guidelines for structured change management and "project" descriptions which have to result in structured safety assessments.</u> • Besides that, very the topic of the publication of operational or infrastructural changes and inherent deviations from existing standards showed weaknesses. Besides the lack of clarity on what to publish with how much detail very often also the process of the publication itself (initiation, quality assurance and involvement of authority) was not fully clear and structured. • <u>Clear guidelines on what to publish in the aerodromes AIP and a clarification on the responsibilities are necessary.</u>	• The fundamental concepts of at least basically identifying hazards and potential risks in front of infrastructural and operational changes are found almost all over. • However, they often only rely on individuals' special attention and experience than on processes being clearly established. Structured and comprehensibly documented concepts are rarely found. • Only in a few cases – in accordance with clear internal guidelines – documented evaluations are carried out at the aerodrome with clearly defined responsibilities and approval concepts. • Very often also the documentation of such issues is rather basic or not existing at all. Reasons for decisions of the past cannot recalled – both at airport level and at the CAA.

Internal safety audits	
• Legal provisions and directives for this type of regular internal audit for aerodromes are the result of respective ICAO requirements. • Accordingly for the most countries that intended to implement SMS at least basic legal requirements can be found. • Problem: Beside the basic statement that internal assessments or control procedures should exist not much detail is given in the legal framework of the majority of the states visited. Therefore also the control and oversight procedures of the national authorities do not really address that SMS element. • The need for guidelines and basic standards for the SMS element internal audits is obvious. Structured internal assessment of the SMs and the internal processes of an aerodrome are – beside safety oversight by the authorities – the only way to identity deficiencies and optimisation needs. A structured standardized approach is needed; just inspections (or nothing at all) are not enough.	• Even here, there is a huge disparity between the different solutions. At several aerodromes regular internal audits are carried out by dedicated departments that are centrally organised. Sometimes it is a dedicated SMS-department, sometimes it's the aerodromes central audit unit. Others carry out individual audits separately. • However, on closer examination these have a tendency to take the shape of an inspection mostly without a structured long term audit plan. Only very limited long term internal audit concepts have been found. • Just some airport operators (mainly multi-airport-operator) had developed audit concepts where a centralized audit team was deploying activities all over in the company. • Besides that the status very much did depend on the implementation status of the SMS in general. In states where either the legal framework was weak or even non-existing and where the aerodromes did not develop own focus on that matter no audit activities at all have been conducted. • In some very limited cases different aerodromes "shared" auditors in order to get others' experience in their own aerodrome.

Defined safety targets	
• (Globally) this area cannot be regulated or is hard to regulate because of the lack of a sufficient data basis. • Consequently only very few authorities have defined basic target levels of safety, but in very limited terms or lacking in clarity. • Even for the upcoming new European legal framework for some aerodromes in Europe that goal might not be achievable very soon.	• Also here, comprehensive foundational orientations are almost found nowhere at the individual aerodromes and if so only very rarely. • Only established target values and those used on the part of the performance of the ILS are used. • Some first steps and very basic TLS have been developed, but mainly oriented at concepts like accidents per traffic data or planed audits vs. Realized audits etc.

Safety performance monitoring	
• In most of the countries visited clear legal requirements (and especially common safety performance indicators (SPI)) are missing completely. Only sometimes a general requirement to monitor the performance of the SMS exists. Some states agreed on basic SPI are used – but not legally enforced. • The authorities have repeatedly delegated the task of definition of the indicators and monitoring (and other details) to the aerodromes. The downside of this is that in so doing, comparisons at state level are limited or not possible at all, since every aerodrome is probably working with different concepts and indicators. • Other authorities do not request any performance monitoring at all. • <u>The new European rules need to include at least some common SPI which allow for quick comparison and assessment of performance. They have to be developed further based on the data which might be collected in the future.</u>	• At some of the more developed aerodromes some very good and advanced monitoring tools and indicator definitions could be discovered. • These ideas started from basic monthly or quarterly safety reports to be delivered to management and CAA up to – very rarely – detailed indicator observation. • However, very often some very fundamental elements such as reporting etc. have not been implemented comprehensively; therefore no data is available to be monitored. • More precise information and concepts for monitoring the development of SMS and the service it renders have taken a back seat.

Safety promotion and training	
• Legally binding and clearly regulated training and qualification requirements which specifically focus on the area of SMS were not be found in virtually any of the countries. • Only basic request that just the Safety Manager must be sufficiently qualified could be identified. • <u>Due to the importance of that topic a very structured and comprehensive catalogue for requested safety training for certain personnel (management, staff, SMS staff, authorities etc.) must be developed. The majority of the tasks at hand cannot at all be sufficiently dealt with without proper training.</u> • <u>Beside that clear qualification criteria for such personnel (authorities' staff, SMS staff, but also airport management) must be defined and the compliance to such criteria must be assured.</u>	• At aerodromes where SMS is implemented in a basic format, SMS training is usually carried out on a limited scale in addition other trainings. • Appropriate SMS training at the aerodromes is usually carried out in the context of other legally required trainings (e. g. like apron drivers license, security awareness training etc.). • Sometimes additional concepts of promoting and communicating SMS concepts like posters, flyers etc. were found. These are mainly used on the initiative of the aerodrome rather than on authority's demands. • Only very rarely all personnel involved in safety issues got the necessary training. That concerns not only the relevant aerodrome personnel but also the staff from authorities. Besides that especially the leading management personnel of some/many aerodromes often lacked proper knowledge of the relevant SMS basics.

4 HORIZONTAL ANALYSIS OF THE TECHNICAL ASSESSMENT OF AERODROMES

4.1 INTRODUCTION

This chapter provides a coarse analysis of the results of the technical assessments conducted at the 56 visited aerodromes. The main focus of this analysis is to examine the aerodromes':

- utilisation of ICAO or national documents (regulations, guidance material) for aerodrome planning and operations;
- compliance to ICAO Standards and Recommendations;
- awareness of deviations (incl. the methods to identify deviations, through internal or CAA audits);
- handling of deviations (implementation of mitigation measures other than the publication of the deviation in the AIP, performance of safety assessments, publication of the deviations in the AIP);
- change management procedures (established formal procedures, utilisation of safety assessments etc.).

While the management of applicable regulations at the aerodromes varies strongly among the visited countries and aerodromes, the overall situation is – though some improvements could always be made – satisfactory. Especially the large aerodromes have the technical and financial capabilities to develop best practices.

Though ICAO specifications are in some countries not directly applicable, and the applicable national regulations do not enforce to the greater extent ICAO Recommendations, several aerodromes aimed to fulfil the ICAO Recommendations over and above the Standards.

In most cases, non-compliances to ICAO Annex 14 SARP's are mainly due to technical or economic impossibility. Although little guidance materials is available on safety assessments and no target levels of safety are defined, several aerodromes conducted safety assessments to measure and minimise the impact of the deviations on operational safety.

The change management procedures observed ensured that the CAA is aware of any changes at the airport, and that the changes comply with the applicable regulations or that the impact on safety is minimised.

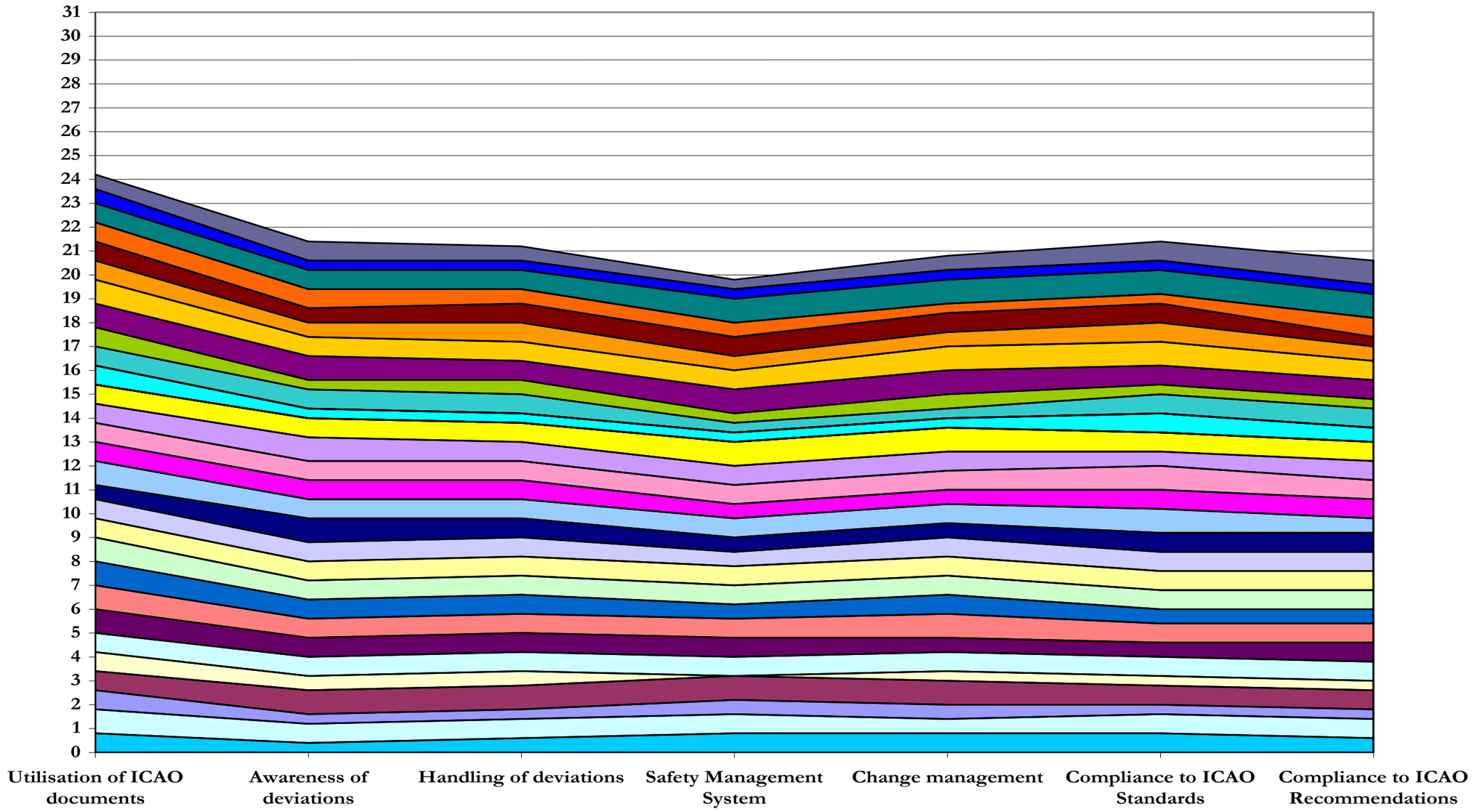


Figure 30: Gap Analysis "Technical Data for Large Aerodromes"

Note:
Please directly refer to **1 Horizontal Analysis of Legal Framework and the competent Authorities for aerodrome safety, p. 42** for detailed explanation of the methodology used to perform a horizontal analysis.

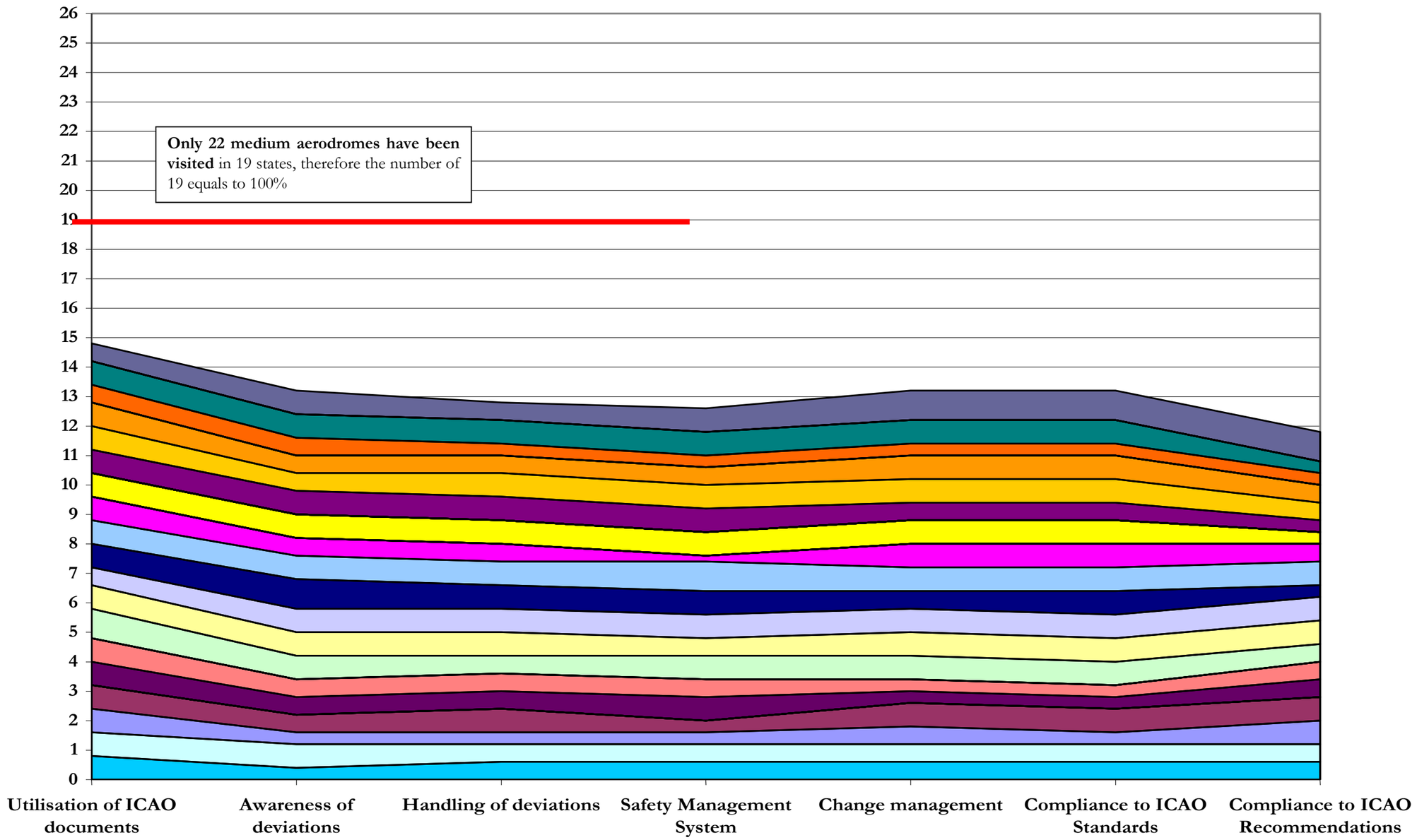


Figure 31: Gap Analysis "Technical Data for Medium Aerodromes"

Note:
Please directly refer to **1 Horizontal Analysis of Legal Framework and the competent Authorities for aerodrome safety, p. 42** for detailed explanation of the methodology used to perform a horizontal analysis.

4.2 UTILISATION OF THE ICAO DOCUMENTS

In most countries the original ICAO documents are used for the planning of infrastructure and operations. Beyond the ICAO Annexes, more detailed materials such as e.g. manuals are used for more detailed planning, especially at aerodromes with a high level of traffic. Exceptions to this are mainly countries in which national specifications are exclusively applied for certifications or where comprehensive guidance material in the respective country's language, which goes beyond the requirements of Annex 14, is made available.

The ICAO documents are in most cases obtained directly from ICAO by the aerodromes. Rare exceptions to this occur in countries in which the documents are made centrally available to the aerodromes either by the CAA or the national air navigation service provider (ANSP).

Ideally, as found at some aerodromes, the respective ICAO documents are kept available centrally and up-to-date in electronic or paper form at the aerodromes for all employees.

4.3 COMPLIANCE TO ICAO STANDARDS AND RECOMMENDATIONS

Throughout the interviews with the CAAs and the aerodromes, all interviewees stated that their aerodrome aims to comply with the ICAO Annex 14 SARPs or the applicable national regulations. However, the visits to the aerodromes have shown that in all countries, and at almost all aerodromes, deviations from the selected Standards and Recommendations could be identified.

As the five small airports visited during the interviews are not in the actual scope of the EASA and the visited large and medium aerodromes (51, all IFR aerodromes) are generally subject to identical requirements, the following analysis focuses on the medium and large aerodromes.

The Figure 32 and Figure 33 display the number of compliant and non-compliant infrastructural elements to the selected Standards and Recommendations at the 51 visited medium and large aerodromes.

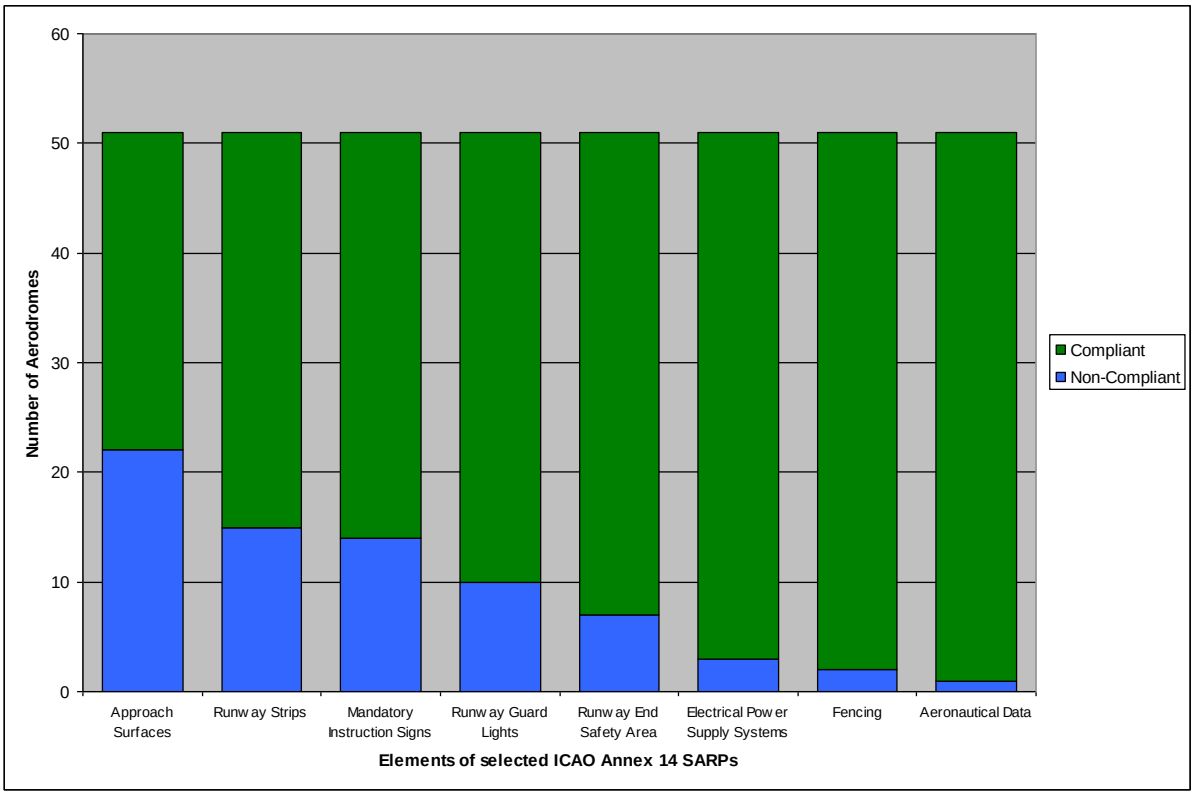


Figure 32: Infrastructure Compliance to ICAO Standards at Medium and Large Aerodromes

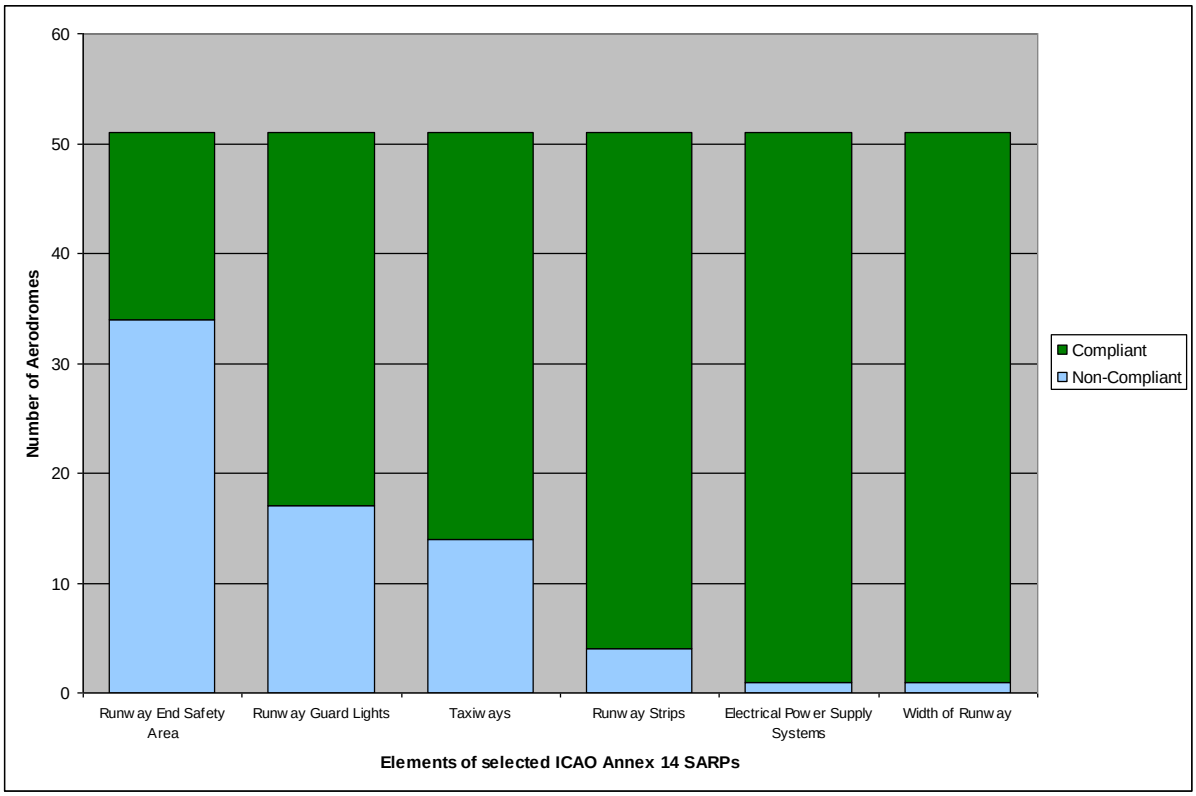


Figure 33: Infrastructure Compliance to ICAO Recommendations at Medium and Large Aerodromes

As displayed in Figure 32, the most common non-compliant elements to the ICAO Standards at medium and large Aerodromes are the approach surface (at 22 aerodromes), runway strips (at 15 aerodromes), mandatory instruction signs (at 14 aerodromes) and runway guard lights (at 10 aerodromes). Further identified non-compliances are related to the runway end safety area, aerodrome emergency planning, electrical power supply system and aeronautical data specifications.

According to Figure 33, ICAO Recommendations related to runway end safety areas, taxiways and runway guard lights are frequently not implemented. For instance, 34 of the 51 large and medium aerodromes do not fulfil the ICAO Recommendations on runway end safety area (240 m should be provided at Code 3 and 4 aerodromes), 14 aerodromes do not fully comply with the ICAO Recommendations on taxiway widths and 10 do not comply with runway guard lights.

The assessment of the aerodromes compliance to ICAO SARPs related to operations have shown that the most common deviations are related to aerodrome emergency planning and exercises, as well as rescue and fire fighting services. Large and medium aerodromes visited do not comply with the ICAO SARPs related to aerodrome emergency planning and exercises (especially the emergency testing requirements). Regarding rescue and fire fighting services, the two minutes response time to any point of each runway (Recommendation 9.2.24) is only fulfilled by a minority of the aerodromes. These deviations from operational requirements are mostly accepted without further investigation of the impact on operational safety.

The following Figure 34 displays the percentage of non-compliant infrastructural[5] and operational[6] elements at medium and large aerodromes.

[5] Infrastructural elements: Aeronautical Data, Approach Surfaces, Electrical Power Supply Systems for Air Navigation Services, Fencing, Mandatory Instruction Signs, Runway End Safety Area, Runway Guard Lights, Runway Strips, Runway-Holding Position Marking, Taxiways, Width of Runway.

[6] Operational elements are: Aerodrome Emergency Planning, Aerodrome Maintenance, Rescue and Fire Fighting

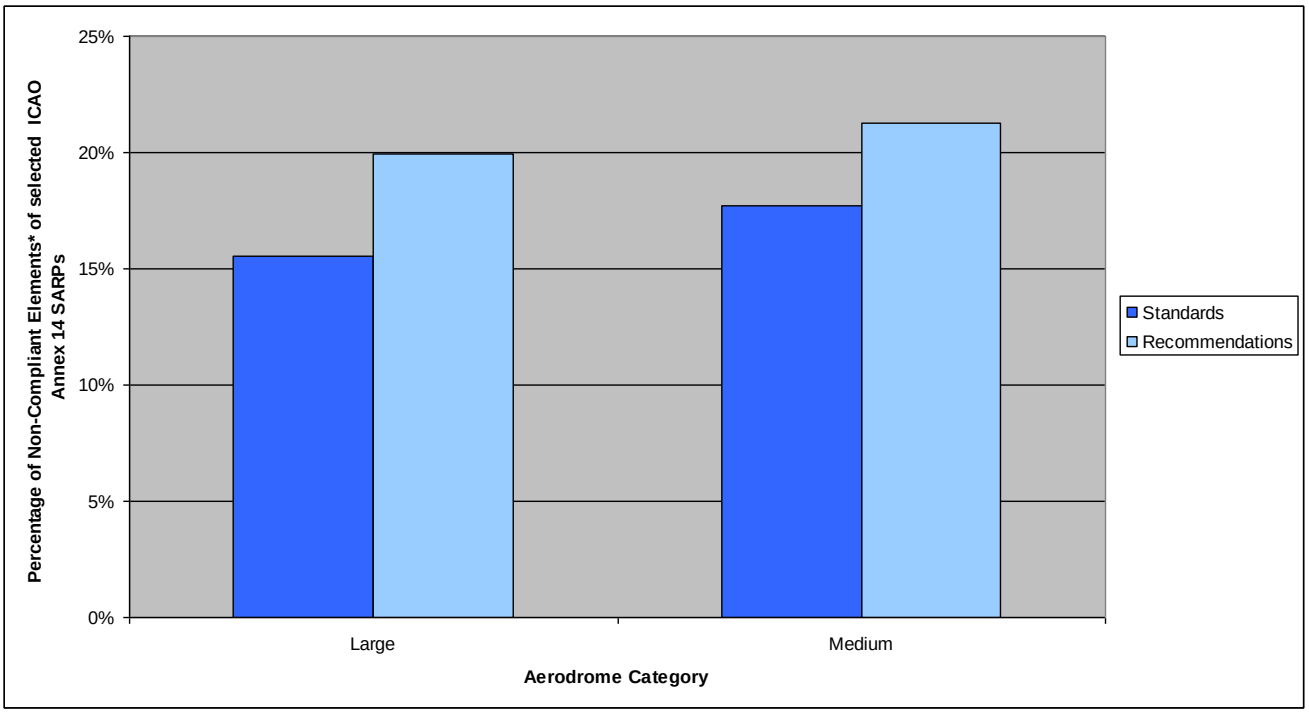


Figure 34: Degree of non-compliance to the selected ICAO Annex 14 SARPs

The statistics displayed in the figure above have to be considered with caution, due to the methodology applied for the selection of the analysed ICAO Annex 14 SARPs, as well as the limited number of aerodromes studied.

However, the following statements can be formulated:

- Large and medium aerodromes have a similar degree of non-compliance to the selected ICAO Standards and Recommendations.
- At large and medium aerodromes, the degree of non-compliance to the selected Recommendations is higher than the degree of non-compliance to the selected Standards.

A more detailed analysis of the data further reveals that there is no significant relationship between the degree of non-compliance to the selected ICAO Annex 14 SARPs and the region of the countries visited (e.g. Western, Southern or Eastern Europe).

4.4 AWARENESS OF DEVIATIONS

Awareness of deviations from the Standards to be applied and from the Recommendations of ICAO Annex 14 is treated very differently by both the airports as well as the authorities.

Because the infrastructures of aerodromes have developed over time, and because of the evolving nature of the relevant guidelines, as well as the staff fluctuations among the accountable parties at aerodromes and inside the authorities, comprehensive information about the compliance of the infrastructure and operations to national and international specifications is available only at very few airports. This is a significant finding as one of the aims of aerodrome certification is about establishing the necessary comprehensive documentation and transparency about deviations and their management.

The tools most frequently used to evaluate compliance to national or international regulations are either audits by the competent authorities in the context of the certification process or internal audits in the framework of SMS. The level of detail of the parameters examined in these audits in respect to the regulations which are to be applied varies here dramatically in the different countries.

It was noted that numerous aerodromes were not aware of possible infringements of the obstacle limitation surfaces as per ICAO. The main reasons for such a situation are first the lack of well-defined responsibility for the assessment of obstacles and second the relative complexity of such assessment. Notably, a common deviation not identified as such by the aerodrome authorities are infringements of the approach surface by aircraft at holding positions (ICAO Annex 14 Standard 3.12.9), which especially found at aerodromes with a displaced runway threshold.

The extent of awareness of deviations here ranges from constantly updated, full compliance lists which must be submitted to the CAA by the aerodrome operators, to internal audits which are merely carried out on an irregular basis and separated by long intervals.

In most of the countries no standardized procedures exist for the systematic recording of deviations from all design and operating parameters of the regulations to be applied. Often parameters are checked during changes to infrastructure or operations. In contrast, the conformity of existing facilities or processes is in only a few countries subject of current checks.

4.5 HANDLING OF DEVIATIONS

The handling of deviations, generally managed jointly by the CAA and the aerodromes, mainly depends on the following parameters:

- Affected parameters (Standard or Recommendation);
- Differences between national and ICAO requirements
- Extent of deviation;
- Traffic figures of the aerodrome;
- Safety culture at aerodromes and within the CAA;
- Capability for evaluating the impact of deviations (e.g. safety assessments).

The last two parameters – which strongly vary with the countries – have considerable influence on the handling of deviations. In the countries that have a well-developed safety culture/ awareness, all deviations from standards and recommendations are examined, if possible, through safety assessments. With declining safety awareness in some countries, deviations relevant to safety are accepted after mitigation measures have been established, but without a detailed evaluation as to their effects. The handling of deviations goes as far as simple acceptance of deviations (e.g. there is no knowledge of deviations or the deviation is evaluated as being not detrimental to safety) from standards which are relevant to safety.

In some cases, the applicable national regulations for the aerodromes differ from ICAO specifications, often due to delays in national implementation. Most of the differences are related to ICAO Recommendations which have not been implemented into national law (e.g. runway end safety area). In those cases, deviations to ICAO requirements are not necessarily recognised as a deviation to national regulations, and therefore accepted without further conditions.

Overall it can be seen that at a majority of the large aerodromes a considerable amount of work is done to evaluate possible deviations and specific mitigation measures are established. Often it is at aerodromes that have less traffic throughput where deviations from standards and recommendations are accepted without an in-depth safety evaluation.

The following figure displays the number of non-compliant infrastructural elements and their handling (implementation of mitigation measures other than the publication of the deviation in the AIP, performance of safety assessments, and publication of the deviations in the AIP) at medium and large Aerodromes.

Furthermore, among the previously mentioned deviations, safety assessments have been conducted only for the deviations related approach surface, runway strip, RESA and taxiways.

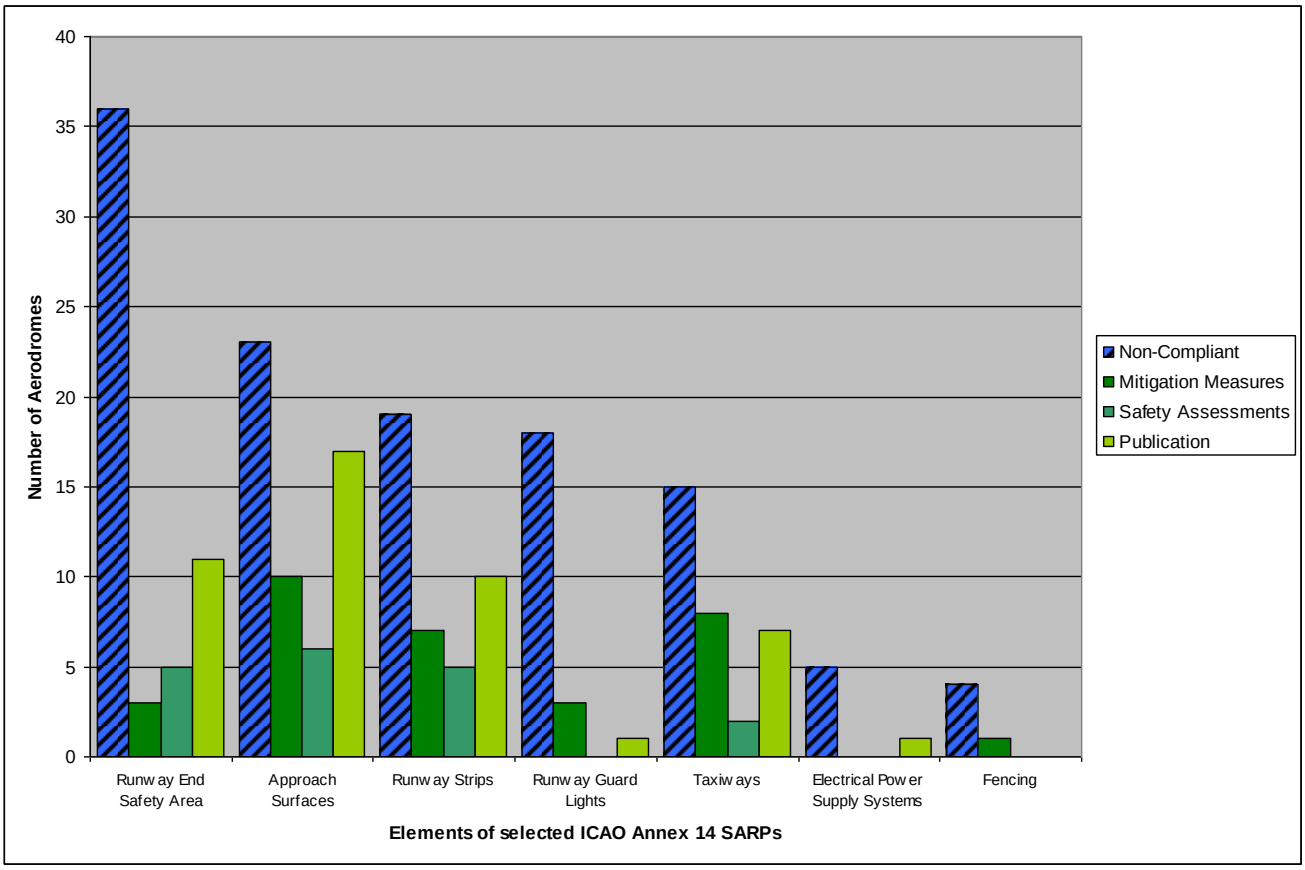


Figure 35: Number of Non-Compliant infrastructural elements (Approach Surface, RESA, Runway Strips, Taxiways) to ICAO Recommendations or Standards and associated actions at Medium and Large Aerodromes

The displayed figure above says the following:

- Operational mitigation measures (other than the publication of deviations in the AIP) are the most often implemented for deviations from the taxiway ICAO Recommendations, as well as for some infringements of the approach surfaces.
- Safety assessments were mostly conducted to analyse the impact on safety of: infringements of the approach surface (6 of 18 infringed approach surfaces have been assessed), non-compliant runway strips or runway end safety area.
- The publication of deviations in the AIP generally realised for known infringements to the approach surfaces, but not systematically (17 of 23 aerodromes published the infringements). Most deviations related to the aerodromes taxiways and associated special taxi procedures are published. However, non-conform runway end safety areas and runway strips are not systematically published in the AIP.

The other deviations identified within the scope of the study (runway guard lights, mandatory instructions signs etc.) are normally not published in the AIP and were also not subject to a formal safety assessment. Such deviations were generally accepted by the CAAs without any formal assessments, mitigation measures or publication of these in the AIP.

4.6 CHANGE MANAGEMENT

The interviews at the aerodromes demonstrated that the handling of infrastructural or operational changes at the aerodromes differs between the countries and also between aerodrome sizes.

At most of the aerodromes, both the aerodrome operator and the CAA plan changes in accordance with the applicable national or international regulations. If the applicable requirements continue to be fulfilled, the majority of the aerodromes are not conducting safety assessments for the upcoming changes. In general, no formal processes for the assessment of the safety impact of the change has been established. However, in six countries every change requires the assessment of operational safety taking into account the implementation of the change.

The handling of changes at large aerodromes varies throughout the different states. At 19 of the large aerodromes, changes which lead to a deviation from applicable regulations have to undergo a safety assessment to examine the change's impact on operational safety. At 15 of the large aerodromes within the visited countries every change has to be checked. These processes are not formal safety assessments at every aerodrome, but involve relevant parties in the development of mitigation measures or hazard identification. At six of the large aerodromes visited, processes are established to conduct safety assessments for every change. The assessments are either conducted by the SMS team or by the process owner with the support of the SMS department.

5 NON-STANDARD SOLUTIONS, PROBLEMS AND BEST PRACTICES

During the visits to the individual authorities and aerodromes in the different countries, often special procedures, interesting special solutions for specific problems but also open topics and problem areas were identified. In reference to the task at hand, namely to enact a uniform set of regulations for a major proportion of European aerodromes, these approaches to solutions, which are to some extent very advantageous, will be briefly explained here. The following section contains the main conclusions; it also mentions critical areas of aerodrome SMS operation and national rulemaking and oversight. It also integrates some of the topics already mentioned, adds more relevant and necessary details and suggests possible improvements.

The use of already established approaches, which have also been proven to be advantageous, can provide significant potential for optimisation and, if applicable, support overall a quicker and better implementation of new guidelines.

At the same time, however, approaches and situations were recognized which must be viewed rather critically, some of which will be briefly described here for the sake of creating awareness. These are to point to the expected effects of the new European guidelines for authorities and aerodromes. But they are also made to avoid just such problems in the future and to build corresponding awareness with the European rule maker.

5.1 IDENTIFIED BEST PRACTICES

5.1.1 IMPLEMENTATION OF ICAO ANNEX 14

Only comparatively few countries have chosen a legal process with which the respective current ICAO Annex 14 SARP's can be directly declared as binding in their country.

But this process, also known as dynamic referencing, can only be applied under very specific constitutional conditions. Many countries have excluded this completely and despite the general ratification of the ICAO treaty always demand formal implementation of the respective new standard into the national law or standards. This implementation must then be always done by an authority that is sufficiently empowered or by the national parliament.

If the dynamic referencing is permissible then it has decisive advantages:

First, all new or changed ICAO guidelines are applicable as soon as they appear, or respectively, as soon as they come into effect in the respective country. Timely and completely consistent application is assured.

On the other hand the respective accountable authorities would have no additional and very often time-consuming special procedures to carry out to introduce the ICAO stipulations. This way they can channel their resources into the direct and timely implementation of guidelines and concentrate their efforts on overseeing their aerodromes.

In addition they would also have more resources free to provide the necessary assistance to the regulated entities (guidance material, etc.). In the countries which have chosen the path of dynamic referencing, overall better aviation safety activities could be identified.

In contrast to views sometimes held, an evaluation of the individual new SARP's is also not necessary and advantageous. The ICAO Member States all have the opportunity to express themselves on the enactment (or non-enactment) of new SARP's – in other words they are correspondingly informed and were able to express their reservations. On the other hand the basic concept of the ICAO provides just for that – the approval of the countries in principle to implement new SARP's. Only in the case that the authorities see themselves as being prevented from implementation for factual reasons, can they accept a difference and notify this to ICAO.

5.1.2 CONCEPTS FOR CAA SUPPORT AND MONITORING OF AERODROMES

In some countries the authorities have chosen interesting approaches to minimize the shortcomings of staff resources and the large number of aerodromes to be monitored, by using special monitoring concepts.

In two cases, mandatory, structured and standardised self-assessments, which summarise relevant infrastructure and operations circumstances, are required from the aerodromes in the framework of annual or even seasonal checks.

The aerodromes are obligated to have evaluations carried out either through self-assessment on mandatory forms (one case), or through assessment organisations, which are suitably equipped and accredited technically. In some cases, the independent or-

ganisations act on behalf of the authorities. In another observed solution, the aerodrome had to hire such organisations. The scope is mainly the airside and the facilities for aerodrome operations (lightning, markings, pavement quality, and the like). Besides that, sometimes management and staffing topics are also covered together with operational criteria. The forms or reports are then submitted to the authorities. They include photographs and descriptions of technical and, if applicable, construction deficiencies in the infrastructure, and the like, thereby allowing the authorities to make an evaluation even without directly viewing the situation personally. This can then be the basis and reason for follow-up inspections or direct instructions to the aerodrome; but it can also be the basis for an extension of an operation permit's validity, for example. The costs of this external assessment and the appraiser's statements are mainly borne by the aerodromes themselves.

In one country, the CAA very much relied on external support delivered by specialized engineering companies. The authority had temporarily hired large numbers of staff for one year and even longer to support certification and oversight tasks. In general, such a concept can be regarded as very interesting for future developments as well. Nevertheless, it has to be assured beyond any doubt that such support does not compromise the independence of the CAA's oversight activities due to the external staff's lack of neutrality. In the case mentioned, the supporting external companies belonged solely or mainly to the major national aerodrome operator.

Other authorities send self-assessment forms on an annual basis which the aerodrome itself fills out, and adds photographs and further corroboration, if applicable, and then returns them to the authority with the information and a signature. Both have several advantages: On one hand the methods translate into optimisations for the authorities. Staff resources and sufficient knowledge about the actual conditions of the infrastructure are assured for the authorities. Furthermore, in this way the aerodromes are more or less forced to regularly inspect their own infrastructure and to evaluate its condition or to have it evaluated by others. In other words, should the aerodrome not on its own initiative carry out regular and comprehensive monitoring of its own infrastructure, technology and operations, then the demands of the authorities will force them to do so.

Also a by-law-required signature on such self assessments by the executive manager does clearly assign and address responsibility (where such responsibility is not taken by the management because of "lack of information"). With a signature the manager takes responsibility for the completeness of the statements and evidence, and naturally also for the remedying of construction deficiencies or other deficiencies which are relevant to safety.

Furthermore, the use of independent and especially technically suitable (and, if applicable, specially accredited) institutions also ensures the quality and can, as final safeguard, also exclude intentional suppression of information.

Appropriate statutory chargeable fees and empowerment for the authorities are necessary; here it is important – if it seems sensible as concept – to develop accreditation schemes, methods and qualification stipulations for independent 3rd party assessors.

5.1.3 CERTIFICATION AND OVERSIGHT THROUGH COOPERATION AGREEMENT WITH LARGER STATE

A special solution was found in one very small country. Due to its small aviation environment, it relied solely on a cooperation agreement with a bigger neighbouring state. That agreement – a formal legal contract – declared

a) the neighbour's rules to be binding on the smaller state and

b) the neighbour's aviation authority to be the smaller state's assessment body (assessments and oversight activities done by the larger state's CAA, formal certification, administrative decisions and permits granted by the authority of the smaller state).

That solution guaranteed a sufficient legal framework, and a trained and staffed aviation authority, whereas a separate one would have been hard to establish and would have provided good oversight activities with difficulty. All such advantages have been possible under the close supervision of the state in charge for its own aviation environment without a gap in legal empowerment and operational safety. That example might be of great interest for quite a few states where only a very small aviation and/or aerodrome industry exists. The efforts to erect and to maintain a separate national CAA might be much greater, and maybe even ultimately unsuccessful, whereas the advantages of such "leased" competence could assure a safe aviation environment. The fact is given that such solutions might only work within the same language environment and might also be hard to achieve due to political and bi-lateral relations.

5.1.4 CERTIFICATION AND OVERSIGHT FEE SYSTEM

Existing cost-covering approaches are of interest considering that the fee system for future aerodrome certification and oversight activities within the scope of EASA may have an impact on the aerodromes (some of the authorities pointed out that additional costs would be a significant source of friction).

A very unique fee concept could be observed in one state:

Basically, the CAA relies on a standard fee for certification. Besides that, an additional fee for the oversight activities of the aerodrome is established. The first part follows a common approach—listing fee amounts in relation to the aerodromes code letter. In contrast, the latter fee is associated with the aerodrome's operational size. The relevant national rule says, among other things, that an airport of a certain operational size has to pay oversight fees according to rising traffic volumes. Even more interesting was the fact that such fees are collected within, or as part of, normal passenger ticket fees.

The introduction of such a system would have a considerable impact at political level as well. In many states different legal frameworks (federal systems, local/regional entities) have to be changed, passenger/people's costs for air traffic would be concerned and totally new fee collection concepts have to be created. Nevertheless, it might be interesting for further consideration since a similar system is already used in some states to impose of aviation security fees. As the importance of operational safety is in no way less important than aviation security, such a model could find some support.

5.1.5 VALIDITY OF CERTIFICATE

Many different concepts for an aerodromes certificate's validity could be observed during the course of the study. The timelines started from just one year up to unlimited validity; the explanations were as varied as the timelines. Very often a limitation—especially after the initial certification—was used to keep the aerodrome's operator "in line" with the CAA's requirements and to keep up their incentive to implement SMS.

While developing the future concept within the new European framework, someone should take into account the following experience: Good staffing at the national CAA, and tight oversight procedures, gave more reason for unlimited certificate validity, since control was in place. In states where the CAA had limited powers, or the oversight processes were not well developed, limitation could more often be identified. The European framework therefore should take account of the resources of the states also in view of the unlimited certificate validity that is the norm in the EASA system.

5.1.6 SUBSEQUENT LIMITATION OF CERTIFICATES' VALIDITY

In some states, it could be observed that the CAA is willing to use timely limitations of the certificate to "heighten the pressure" on aerodrome operators who fail to fulfil the necessary requirements - at all or in time. In one case especially, the national CAA limited the certificate of the state's largest airport to just the following three month to underline the urgent need for action by the operator in the area of safety management. Since that approach proved to be very successful, the need to legally obligate national authorities to revoke or limit a certificate also seems obvious. The new legal framework should include such a penalty concept, possibly also outlining particular examples of where such action is appropriate (or even necessary).

5.1.7 STANDARDISATION OF CERTIFICATION DOCUMENTATION

The requirements on the standardisation of the documentation are also various. Some authorities leave the presentation of documentation as far as possible to the aerodrome; others demand the compliance to uniform structures from all aerodromes to allow quicker comparability and evaluation, but also to promote the exchange of information between the aerodromes. A really good, standardized documentation approach could be observed only on rare occasions. In all cases, it was based on digital and software solutions, which also guaranteed organisation-wide distribution and a sufficient and efficient update method.

5.1.8 LARGE AERODROME OPERATOR

Aerodromes with a common, multi-aerodrome operator enjoy, or at least can enjoy, a lot of benefits. Besides common reporting systems within the organisations' SMS, the documentation system, a central audit department, and standardized guidelines also confer benefit on the individual aerodrome. In addition, "staff sharing" concepts assigning double or multiple responsibilities to one safety manager for different aerodromes have also been observed. Besides that, such large organisations can deploy specially trained personnel on a wide variety of occasions from individual assessments to extension projects and internal assessments.

They also very often benefited from integrated management systems where, besides safety, quality, environmental, and security issues were also managed jointly and centrally by the same unit.

The new legal framework clearly needs to allow for such approaches, since they include many benefits. Even common principles and basic guidelines for integration, and the concepts of centralized and decentralized safety management, should be given.

5.1.9 DETAILS OF SAFETY MANAGEMENT SYSTEMS AT AERODROMES

5.1.9.1 IMPLEMENTATION CONCEPTS FOR SMS

Noteworthy is a country-wide concept for central processing and implementation of standards for aerodrome SMS which was in place in two countries.

Here, in one case, in collaboration between research facilities and the aerodrome, central guidelines and methods for aerodrome SMS were developed and made available to all aerodromes and authorities. The extensive and comprehensive implementation did not fully succeed since the guidelines developed were not binding, so that their application remained arbitrary. This meant that one of the decisive advantages – a standardised method of implementing processes, guidelines and concepts to the same degree at all affected aerodromes – was only partially achieved. These advantages would have especially eased the work of the authorities, but also, and most importantly, would have assured the exchange of information between aerodrome and authorities and could have brought it to a higher level. In addition it most certainly would have also generated substantial cost savings at the aerodromes, which have been lost in the respective independent and individual implementations.

The second very welcome and central implementation concept for the SMS area is based on a clear leadership role of the authorities which enacted clear guidelines, and in particular, standardised and demanded the documentation which must be created. They also carried out, and are still carrying out, together with an example aerodrome, central information events for the entire aerodrome industry. Based on this and a on a clear, phased plan a successive implementation of all required standards uniformly achieved.

5.1.9.2 THE SAFETY MANAGER

In most cases structures were established for the organisational anchoring of the Safety Manager, which include a central role and also a central understanding of responsibility for the core tasks of Safety Management. Accordingly the Safety Manager should be as independent as possible from the Line Management in order to avoid conflicts of interest.

In an observed successful, individual case, a decentralized distribution of responsibilities for the area of SMS was intentionally put in place. This means that e.g. audits are done by a dedicated central audit department; documents are administered centrally and other tasks such as e.g. risk evaluations are carried out by qualified, but employees from different departments.

A central office was set up only for safety communication and coordination, but it had no executive powers whatsoever and only monitored the basic compliance with the principles.

At the same time it was assured that e.g. reports were passed to the larger group of specifically trained specialists <u>and</u> the safety coordinator so that a aerodrome wide knowledge and quick responses where possible.

A situation like this has various advantages: First, the central communicator and coordinator is considerably relieved from the individual daily tasks. These can often be more effectively solved in the individual specialised departments and only be expanded in terms of staff when there is a direct need. This especially concerns time-consuming activities such as document handling, the writing of reports and the development of training programmes, etc.

This way the safety coordinator has the opportunity to concentrate on the questions of communication with the management and the optimisation of important soft factors such as the level of training, awareness and the safety culture.

This solution is advantageous in terms of integration of the entire management structure at an aerodrome; information is distributed more easily and immediate consciousness about one's own role and responsibility in SMS is promoted.

5.1.9.3 RIGHTS OF THE SAFETY MANAGER

In one case extremely comprehensive, clear legal guidelines were applied to the role of Safety Manager and he/she was given virtually unique powers toward his/her management. The guidelines are listed as follows:

(1) The aerodrome company appoints a … person as officer for the safety management system. …The officer consults with the company management in all matters which are relevant to the set-up, operation and ongoing development of the safety management system. The company management is to support the officer in the fulfilment of his/her duties and to free him/her as far as necessary from other operating tasks. In particular it is to make available to him/her assistant personnel and rooms, facilities and tools in as far as this is necessary for the carrying out of tasks.

(2) The aerodrome company ensures through organisational measures in internal operations that the officer can directly investigate in person all situations which are relevant to the safety management system and that his/her suggestions and concerns in this regard can be directly distributed among the company management in either written or verbal form. In the case of unresolved differences of opinion about such conditions the officer can request the company management to explain the main reasons for their attitudes.

(3) The aerodrome company may not penalize the officer for the safety management system and his/her assistant personnel for the fulfilment of the tasks they have been given. Revoking of the appointment as officer for the safety management system requires the consent of the licensing authority.

In reality it is difficult for a Safety Manager to undertake the role in this way. Role definitions usually seem to function better where a broad networking and anchoring of the SMS in the aerodrome and its organisation itself, are assured. The formation of a developed culture of safety can only work in the long term on the basis of conviction.

In some countries the role of the Safety Manager was also strengthened (sometimes in addition to other special responsibilities) by listing him/her by name in the aerodrome manual, and in some countries even directly in the aerodrome certificate. His/her central role and significance are clearly documented and communicated at the aerodrome by naming him/her together with e.g. the executive manager.

In some countries also other noteworthy responsibilities were mentioned in the certificate e.g. for special responsibilities such as Head Airport Operations, Head Maintenance, Head ATC and CEO.

5.1.9.4 RESPONSIBILITIES OF THE SAFETY MANAGER

In one case it was possible to observe an interesting solution which was especially relevant to staff shortages and lack of qualifications for safety management at small aerodromes.

In the framework of this special solution, which was approved by the responsible authority, a larger aerodrome which was also responsible for the operation of a small aerodrome undertook the central role and tasks of implementing and running the SMS there. Concretely, that meant that the Safety Manager of the larger aerodrome went to the smaller aerodrome at regular intervals to meet the employees working there, advised them in the evaluation of pending construction measures and other measures relevant to safety, and also managed the communication with the authorities in these cases. Additionally, at least the basic relevant documents of the small aerodrome were adapted to the guidelines of the large aerodrome and in some parts the necessary documentation and regulations were the same.

This way a separate post, which would have hardly been justifiable in terms of cost, was avoided; the advantages of the standardisation outweighed the possible disadvantages.

5.1.9.5 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Only in rare cases it was possible to find a solution where a comprehensive identification of all sources of danger existing at the aerodromes and the systematic and standardised evaluation of these have been undertaken. Even though e.g. current deviations from Annex 14 were recorded and observed also in other countries, here one relied in many cases on the information provided by the aerodrome and demanded no regular check of lists and the actual situation in terms of its chronological development. Comprehensive and sufficient identification of hazards at an aerodrome must be carried out on an ongoing basis; risks which are identified and determined must be categorized in terms of relevance and clear measures to solve them in a way corresponding to relevance must be planned and implemented.

These actually-necessary measures were found – as already mentioned – only once on this large scale.

5.1.9.6 INTERNAL AUDITS

For the internal audits which are prescribed in the framework of an SMS there are often insufficient resources, especially at smaller aerodromes. Often audits do not really appear promising when the small size is taken into account. Here the basic, required independence of the auditor plays a role, which is hardly possible to assure at small aerodromes because of numerous overlapping responsibilities.

To solve this problem, in one case several aerodromes have joined together to have the respective required audits carried out, at least to some extent, by employees from other aerodromes. In addition to the increased independence of the other aerodrome employees, the aerodromes involved expect to achieve advantages from this through the exchange of experience and so-called best practices.

These kinds of approaches should not be undermined, at least in the new European standards; if applicable, appropriate guidance materials or AMC should be considered which recommend such methods and collaborations. The exchange of information, in particular, and the potential for optimisation which is available through this should be utilised.

5.2 IDENTIFIED OPEN ISSUES AND NON-STANDARD SOLUTIONS

The methods and situations which are described below and identified in the course of the study and the various visits to authorities and aerodromes are to be viewed more critically. In many cases such situations are impossible to avoid, alone because of the development over time, national peculiarities and political and constitutional developments. In these cases precautions should be taken, at the very least, so that these situations do not lead to poorer operational safety at the aerodromes.

5.2.1 MISSING IMPLEMENTATION OF ICAO SARPS, MISSING LEGAL OBLIGATION OF THE AERODROME OPERATOR

In a few cases, at the time of the study there was neither a national implementation of the ICAO guidelines nor was it finalized and fully legally concluded. Several reasons lead to this, which were understandable for the most part in the context of their historic origins; but the problem or the immediate consequences represent a legally very inadequate situation.

The authorities cannot obligate the aerodrome operators in a legally binding way to comply with the ICAO guidelines. Thus, in the case of deviations – even critical ones – they have hardly a legal basis for dealing with it and also often insufficient powers to deal with such situations or to forbid operations which are unsafe.

In one of these cases, even though there was an obligation in civil law for the operator to comply with the existing international and other standards, it was very general and just one part of a franchise contract which also did not even receive authorisation from an aeronautical authority.

5.2.2 THE STATE AS AERODROME OPERATOR

In many cases, the state, as the owner of privatised companies which are responsible for the operation of aerodromes, is at least indirectly involved. In a few individual cases, the state itself was—-mostly in the form of the aeronautical authority—- even a direct operator of individual aerodromes, without a legally independent organisation having been established for this. In these cases, negative effects on the performance and penetration of the states' CAA's could sometimes be observed.

Therefore, in such cases comprehensive safeguards must be put into place to ensure that the same safety guidelines and monitoring concepts are also established for the "state operator" in relation to independent private operators, and all possible separation of the areas to be monitored from the areas directly responsible for operations should be ensured.

The situation was sometimes even more critical when the large (state) aerodrome operator also was the nation's only and largest ANSP. In one case, the CAA even was budgeted from the ANSP. Full independence from the CAA cannot be assured in such situations whereas quite sufficient safety environments could also be observed in some cases.

5.2.3 LARGE AERODROME OPERATOR AND INFLUENCE ON CAA

Here almost the same applies as for the state as operator of the aerodrome(s) (see directly above). Besides the aspect that aerodromes with a common operator might enjoy a lot of benefits, the operator of a very large aerodrome, especially when it is also state owned, may be "overruling" the CAA's decisions, or may be withholding information from the CAA. In some of those cases for instance, the operator made or "suggested" basic CAA information and plans.

Future European legal rules must account for these circumstances and plan appropriately for exceptional situations. Further separation of service provider and oversight entity should be supported. If that is not possible, the inclusion of independent assessment bodies, or "third state" assessments, should be taken into account to assure equal standards and market access for all service providers. Special national advantages due to unequal handling should be prohibited. It seems important that there is a direct reporting duty by each individual aerodrome to the authority so that the latter is always informed about all deviations from rules and this reporting line is not passing through the large aerodrome company before reaching the authority.

5.2.4 RESOURCES AND FUTURE TASKS FOR AERONAUTICAL AUTHORITIES

As already mentioned above the staffing levels of almost all aviation authorities need to be improved. The same applies at least to some extent to the employees' expertise with respect to the latest and sometimes quite high demands for technical and operational requirements and procedures.

The near future with its upcoming new European rules for aerodromes and the still remaining tasks of the CAAs will not reduce the workload of the national authorities. Though uniform standards will exist so that the national authorities no longer bear the burden of rulemaking, the national authorities nevertheless continue to be responsible for issuing regulations in the local language and overseeing the airports; they also remain in charge of the rulemaking for the aerodromes within their scope of responsibility, i.e. those outside the Basic Regulation's threshold. In addition the CAA certainly will have to manage new and greater challenges in implementing the future rules in their countries, carry out corresponding certifications and also establish other more demanding oversight measures etc.

Quite contrary the overall demands for oversight and general tasks of the national authorities will rise, so that it is imperative to counter these specific risks within the future framework. One also cannot really expect that the staffing situation at the national authorities will improve in the future. On the contrary, one of the consequences of expanding EASA's competence may even be accelerated cutbacks of staffing levels, since the noticeable shift of national aerodrome responsibilities to EASA could suggest a lower workload at the agencies. A lower standard and less intensive oversight is also not the right answer to the obvious challenges of the future. Especially in tough economic times operators are more likely to put economic and financial topics in front of all other topics – sometimes before safety. Therefore other concepts have to be defined, which assure a long term solution.

One interesting solution is available, which already has been tested successfully in the past and which also has been used already in some of the visited countries. The use of independent qualified bodies in the oversight and certification tasks of the authorities is such a proven successful solution. On the one hand the European framework already contains necessary legal standards for such concepts, on the other hand e. g. also the European certification of Air Navigation Service Providers (ANSP) has at least in some parts assured to a sufficient level by the use of third parties. For such independent qualified assessment bodies clear accreditation and qualifications standards could assure sufficient quality and expertise, a closed supervision by the authorities could be enforced and sufficient capabilities are on hand for the time being.

5.2.5 UNIFORMITY OF THE GUIDELINES FOR AERODROMES AND ANSP

In some cases the visited aerodromes (and also others in the area of responsibility of the authorities) were approved aerodrome operators and at the same time also certified as ANSP.

Here the question was often posed, which standards and individual guidelines the two licensing systems deal with and how far their application goes in the respective aerodrome organisation. Especially with smaller companies and organisations, the establishment, for example, of two different SMSs (aerodrome operations and flight safety operations) and double accountabilities are not helpful and can also quickly lead to communications problems and then safety problems.

Especially interesting is the question of how to assess the validity of these regulations if e.g. the guidelines in the area of aerodromes are only very rudimentary, while the already established legal guidelines in the relevant EU provisions are detailed and specific.

The question is relevant especially from the standpoint of the expansion of EASA competency which, in the future, will comprise both the area of air operations as well as the area of aerodrome and ATM. Compatibility, or at least common fundamental principles, must be assured otherwise it will surely be difficult for many service providers to satisfy the guidelines.

5.2.6 STATE SAFETY PROGRAMMES AND SAFETY ASSESSMENTS

The required State Safety Programme (SSP) exists in almost no state. Only drafts and basic concepts could be identified. The main problem when states create or try to develop an SSP is in defining an overall target level of safety (TLS). Clear guidelines and additional support are very desirable, considering the fact that actual safety data availability does not really allow for such a TLS definition.

Beyond that, aerodromes often require detailed guidelines to conduct of safety assessments. In countries where aerodromes started to conduct quantitative assessments, there are often deficiencies in the definition of a target level of safety. No clear handling of TLS exists especially in states where no SSP or no draft has been developed yet.

5.2.7 PUBLICATION OF DEVIATIONS

It was very often possible to observe problems with the publication of aerodromes' deviations. Starting with the main topic about what has to be published, questions also arose about who is publishing, assuring quality, and content. Often, no process was defined beyond that, and the procedures were not properly overseen. Differences between different sources of information (official AIP vs. Jeppesen) also played a role.

Amongst other things, the new European rules have to clearly define not only roles and responsibilities, but also in detail which information has to be published in an aerodrome AIP.

5.2.8 OBSTACLES

An open issue, and in many states an existing problem, was the subject of obstacle. Clear legal rules on aerodrome, CAA, and ANSP responsibilities, the designations and size of protected areas, the CAA's control procedures, and the assessment and approval of procedures for obstacles was one of the most frequently occurring safety-relevant topics. Only very few countries have clear rules in place and have established a concept for monitoring and assessing existing obstacles. Some countries have no rule in place at all. Very often, unclear responsibilities and missing maps, publications, and area definitions compromise operational safety at many airports.

The protection of the surrounding areas is very often not assured; legal obligations for the prevention of obstacles through buildings are not in place.

Unfortunately in this area the EASA Basic Regulation as amended by 1108/2009 is not giving Europe the mandate to regulate this area. The aerodromes are to monitor the obstacle situation in their surroundings, while the Member States are to secure that's threats to aviation safety are removed. How serious the states will take this obligation remains to be seen.

5.2.9 RESCUE AND FIRE FIGHTING

In some countries there were varying accountabilities, or those which were "outside of the field of aeronautics" established for the rescue and fire fighting forces stationed at the aerodrome. In one case the operations crews were the direct responsibility of the ministry of the interior – as part of national police forces – in another case, the national catastrophe protection authorities or the municipality.

These accountabilities from external areas have led, to some extent, to simple coordination problems, but also to difficulties in carrying out emergency exercises. Special accountabilities such as this must also be taken into consideration by the future European guidelines, so that the aerodrome operator has a say in the qualification and recurring training of the RFFS staff.

ANNEX 1

Annex 1 was deleted for this anonymous version of the horizontal report.

ANNEX 2 - SELECTED KEY SARPS

1 VERSIONS OF ICAO ANNEX 14 VOLUME 1

The version of the ICAO Annex 14 used for the selection of Key SARPs during phase 1 of the study was: ICAO Annex 14 Volume 1, Forth Edition, July 2004, Including Amendments 7-9.

The meanwhile new published edition of ICAO Annex 14 Volume 1 - Fifth Edition, July 2009, Including Amendments 1-10A - has been analysed for changes of the original selected ICAO Key SARPS. The changes were incorporated in phase 2 of the study.

2 SELECTED KEY SARPS

2.1 INFRASTRUCTURE

Width of Runway:

- Recommendation 3.1.10

Runway Strips

- *Precision approach runways*
  - Standard 3.4.3
- *Non-precision approach runways*
  - Recommendation 3.4.4
- *Non-instrument runways*
  - Recommendation 3.4.5

Runway End Safety Area

- Standard 3.5.1
- Standard 3.5.2
- Recommendation 3.5.3
- Standard 3.5.4
- Recommendation 3.5.5

Taxiways

- Recommendation 3.9.3
- Recommendation 3.9.5

Fencing

- Standard 9.10.1
- Standard 9.10.2
- Standard 9.10.3

Approach Surfaces

- *Non-instrument runways*
  - Standard 4.2.1
  - Standard 4.2.2
- *Non-precision approach runways*
  - Standard 4.2.7
  - Standard 4.2.8
  - Standard 4.2.9
- *Precision approach runways*
  - Standard 4.2.13
  - Standard 4.2.15
  - Standard 4.2.16
  - Standard 4.2.17

Runway-Holding Position Marking

- Standard 5.2.10.1
- Standard 5.2.10.4 (added during phase 2)

Runway Guard Lights

- Standard 5.3.22.1
- Recommendation 5.3.22.2
- Recommendation 5.3.22.3

Mandatory Instruction Signs

- Standard 5.4.2.8
- Standard 5.4.2.9
- Standard 5.4.2.10
- Standard 5.4.2.11
- Standard 5.4.2.12

Electrical Power Supply Systems for Air Navigation Services

- *Precision approach runways*
  - Standard 8.1.6
- *Runways meant for take-off*
  - Standard 8.1.7
- *Non-precision runways*
  - Recommendation 8.1.8
- *Non-instrument runways*
  - Recommendation 8.1.9

Aeronautical Data

- Standard 2.1.5

2.2 OPERATIONS

Aerodrome Emergency Planning

- Standard 9.1.1
- Recommendation 9.1.5
- Standard 9.1.12
- Standard 9.1.13

Rescue and Fire Fighting

- Standard 9.2.1
- Standard 9.2.3
- Standard 9.2.5
- Standard 9.2.6
- Standard 9.2.7
- Standard 9.2.23
- Recommendation 9.2.24
- Recommendation 9.2.25
- Recommendation 9.2.26 (added during phase 2)
- Recommendation 9.2.37

Wildlife Strike Hazard Reduction

- Standard 9.4.1
- Standard 9.4.2

Surface Movement Guidance and Control System

- Standard 9.8.1

Aerodrome Maintenance

Recommendation 10.1.1

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