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NLR-CR-2021-138 | May 2021

Review of the FOCA supervision of Swiss civil aviation

CUSTOMER: DETEC



NLR – Royal Netherlands Aerospace Centre



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AUTHOR(S):

A.L.C. Roelen	NLR
P.J. van der Geest	NLR
M.A. Piers	NLR
J. Choi	NLR

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APPROVED BY :		
AUTHOR	REVIEWER	MANAGING DEPARTMENT
Alfred Roelen Digitally signed by Alfred Roelen Date: 2021.05.10 10:58:32 +02'00'	B. Klein Obbink Digitally signed by B. Klein Obbink Date: 2021.05.10 11:26:23 +02'00'	Alex Rutten Digitally signed by Alex Rutten Date: 2021.05.10 22:13:44 +02'00'

Summary

The objective of this review is to determine whether the FOCA supervision of Swiss civil aviation has systemic deficiencies. A systemic deficiency is a deficiency experienced by the whole of the supervision of Swiss civil aviation and not just particular parts of it.

From the observations of our investigations we conclude that all elements of a state oversight system for civil aviation are in place and correctly organised. The system is working, and is in several aspects of world class quality, for instance the knowledge and experience of the personnel, staffing and budget levels. However, the oversight system is vulnerable to certain disturbances, which might be difficult to identify and which may have severe consequences. Recommendations are provided to provide further protection against the identified vulnerabilities.

The review considers institutional arrangements and governance, and five primary tasks of safety oversight:

- Monitoring of safety performance;
- Verifying compliance with applicable safety regulatory requirements;
- Response to findings or observations of oversight activities;
- Safety promotion;
- Generation, maintenance and utilization of safety oversight records.

The information for this review was obtained through interviews, relevant documentation and comparison with aviation safety oversight practices in other states.

Observations

The Federal Department of the Environment, Transport, Energy and Communications (DETEC) deals with infrastructure and environmental matters. All modes of transport, communication networks and the power grid all fall under its remit, as well as issues relating to the environment and health and safety. The Federal Office of Civil Aviation (FOCA) is responsible for the supervision of civil aviation and for aviation development in Switzerland. It is one of the seven Federal Offices of the Department.

One function within DETEC is primarily tasked to look after the functioning of FOCA. This Civil Aviation Safety Officer (CASO) was established in 2003 to strengthen the ability of DETEC to give guidance to FOCA, to monitor the performance of FOCA on a regular basis and to act on behalf of the Swiss government in state level aviation policy matters. Currently the future focus of this function is being reviewed and new staff has been hired. This function is embedded in a newly formed Safety Office that is tasked to perform multi-domain risk management (transport, aviation, communication, energy and environment) related to the offices under the responsibility of DETEC. The specific CASO function, as such, therefore disappears and potential aviation safety issues will be brought to the attention of the DETEC Secretary General by the Head of the new Safety Office, as part of multi-domain risk management.

Through parliamentary representation, aviation interests in Switzerland have a more direct influence in political decision making and hence in the functioning of the Departments and Offices than in other states. Swiss aviation policy is being shifting towards a more important role of sustainability. While Swiss politicians and policy makers are accustomed to having a fair amount of autonomy to take decisions at the national and local level, they are bound by extensive and complex standards and regulations from the International Civil Aviation Organization (ICAO) and the European Aviation Safety Agency (EASA). Due to the very large scope of work of the Department and the minimal staff

dedicated to aviation, DETEC is not in a position to oversee the work of FOCA other than at the political level. The department has strong confidence in the oversight by FOCA.

In a general sense all data sources available to FOCA to *monitor safety performance* are well managed and processed within FOCA. However, it may be questioned whether the safety picture at FOCA is fully accurate and comprehensive. There is much focus on compliance rather than assessing the actual safety performance and observations regarding the performance of Safety Management Systems of the aviation industry and their results are not fully used. *Surveillance activities* are largely compliance based. A transition to performance based safety oversight is work in progress. The inspectors are knowledgeable and experienced, many of them have worked in the industry before joining FOCA. Relations between FOCA and the industry, especially the larger companies, are harmonious. This supports the credibility of inspectors, but adequate checks and balances must be in place to ensure that FOCA remains sufficiently critical, avoids regulatory capture and does not develop blind spots. *Response to findings or observations of oversight activities* are classified and handled by FOCA according to EASA directives. When it comes to enforcement there appears to be no clear standardization or guideline concerning the appropriate sanction to be applied in a given case. This may lead to the perception that some companies are sanctioned more strictly than others. For the purpose of *safety promotion*, FOCA has published a statement on just culture in relation to the reporting of occurrences. FOCA has also invested in developing the capability to assess the safety culture, but safety culture assessment is by some inspectors still seen as secondary to verifying compliance. *Safety oversight records* are filed using dedicated software. The structure of the tool guides inspectors in a clear manner but there is no emphasis on safety culture and SMS maturity is not very well reflected in the inspection results.

Discussion

Although safety oversight is of a good level, there can still be vulnerabilities that may lead to risk when unchecked, particularly at the interfaces between FOCA and the various actors in aviation. The functioning of FOCA as an oversight organisation must also be regarded in that perspective. Organisation, staffing and available expertise are necessary conditions for performing effective oversight, but the ultimate objective to manage aviation safety to a an acceptable level, with an aspiration of continuous safety improvement, can only be achieved by the efficient cooperation of all involved sector parties, including the Government and the associated ministerial department. Potential vulnerabilities in the entire aviation safety chain may lead to a gradual erosion of the safety functions that may be hard to notice from the day-to-day oversight activities, even if they are well organised at a local, or individual, level. Such gradual erosion may introduce risk and eventually lead to serious incidents or even accidents.

Relationship FOCA-DETEC

FOCA and its Director General are well qualified to carry their responsibilities and do so in an effective manner. But it remains important to ensure that the focus can stay on the primary responsibility for safety. One necessary safeguard to manage that risk is to ensure that sufficient resources are available at the department with a dedicated focus on aviation and the aviation knowledge and experience necessary to fulfil that role.

Internal organisation of FOCA

Internal communication, exchange and sharing of viewpoints, best practices and safety information among the safety branches should be an essential part of the overall oversight activities. However, communication between employees of the safety divisions is limited. Employees are not fully aware of activities and working practices outside their division. This compartmentalisation may lead to a narrow and incomplete view on the overall risk picture and the potential loss of 'weak signals'.

Civil Aviation Safety Officer

The set-up of multi-domain (transport, aviation, communication, energy and environment) Safety Office within DETEC that is currently being prepared could be a worthwhile initiative, from which also aviation safety may benefit. There could certainly be benefits in terms of the wider impact across the department as whole, for the further development of the maturity of risk management, and for cross-departmental learning. The functioning of the new entity will have to be closely monitored in order to ensure that an essential safety feedback loop remains intact. It needs to be assessed whether the removal of the dedicated CASO function is acceptable in view of the already minimal amount of resources at the Department with a specific aviation focus and expertise.

European Aviation Safety Agency

The EASA-regime may be perceived, particularly by smaller companies, as an overregulation that can be counter-effective from a safety viewpoint. In this context FOCA could be more pro-active to support the smaller companies to remain compliant within the European regulatory structure. This is not a typical Swiss issue, as also in other countries similar experiences are noted. Such support requires an open and transparent dialogue, with recognition of each other's roles and responsibilities.

Transition from compliance based to performance based safety oversight

The transition from compliance based oversight to performance based oversight requires, in addition to the knowledge, skills and safety information system that are needed for assessing compliance, complementary knowledge, skills and safety information. As this performance based approach to aviation safety is new to all parties involved, it is a journey of discovery that requires frequent adjustments in order to be successful. These adjustments can be based on internal and external feedback. From the interviews with other European CAAs it is apparent that this is a universal challenge. FOCA seems to be lagging a bit in comparison with the best practices of other CAAs.

Relationship FOCA with industry

Many of the personnel at FOCA, including the managers, have worked in the industry before joining FOCA. In general harmonious relations are maintained, in particular with the larger companies. Working relations with some of the smaller companies are less harmonious and access to higher management levels at FOCA appears much more difficult. It is clear that this may hamper the interaction with these smaller organisations and the ability of FOCA to monitor their safety performance. This is an issue that will need attention of FOCA.

Because of the deep interconnections in the aviation sector as a whole – including FOCA, a case could be made for the necessity of additional organisational and/or procedural safeguards to be confident that any risks to strong and impartial oversight are identified timely and managed effectively. Open and non-judgemental discussions about practices and experiences can be beneficial to enhance best practices and avoid the development of blind spots. Transparency, both internally and externally, is an essential condition for this.

Summary of the conclusions

1. There are no indications of the existence of systemic deficiencies concerning oversight of the Swiss aviation sector.
2. Resources in terms of budget and personnel are sufficient.
3. The technical and operational expertise of the inspectors is at a high level. The ability to properly interlock the combined competency can be improved.
4. Tools for the assessment of the maturity of safety management systems and safety culture can be improved.
5. The transformation of the CASO function to a multi-domain Safety Office will have certain advantages, such as opportunities for cross-fertilization (mutual learning from other domains). However, this also means that

the task of providing a monitoring function and an independent feedback loop concerning aviation safety to FOCA and the decision makers at political level may be lost.

6. The relatively strong interconnections between FOCA and the civil aviation industry are advantageous as they contribute to the maintenance of harmonious relationships between FOCA and the industry. However, harmonious relationships might become an obstacle for maintaining sufficiently critical and independent towards the industry that is being supervised. Such a situation requires a system of check and balances to ensure that inspectors maintain critical and independent.
7. The relative independence of the FOCA from DETEC in combination with a changing political attitude towards aviation result in a setting in which political questions require a lot of attention from the FOCA management.

Summary of the recommendations

1. Organise periodic evaluations of the oversight system.
2. Make sure that sufficient aviation related experience and knowledge remains continuously available at DETEC to facilitate effective interactions between FOCA and DETEC.
3. Make sure that assessments of safety management and safety culture are sufficiently critical and achieve sufficient depth.
4. Improve checks and balances to make sure that inspectors are independent and impartial in their observations and findings:
5. Improve checks and balances to make sure that inspectors are sufficiently critical in conducting audits and inspections.
6. Be transparent towards own staff on communication between senior management of FOCA and industry.
7. Ensure that the corrective responsibilities are fulfilled by a sanctioning system that is transparent, consistent, just and effective.
8. Improve, where necessary, the relationship with the smaller companies in the Swiss aviation sector.

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Abbreviations

ACRONYM	DESCRIPTION
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication (United Kingdom)
CASO	Civil Aviation Safety Officer
DETEC	Federal Department of the Environment, Transport, Energy and Communications
DG	Director General
DGAC	Direction Générale de l'Aviation Civile (France)
DSAC	Direction de la Sécurité de l'Aviation Civile (France)
DTA	Direction du Transport Aérien (France)
EASA	European Aviation Safety Agency
EFK	Eidgenössische Finanzkontrolle (Swiss Federal Audit Office)
EU	European Union
FOCA	Federal Office of Civil Aviation
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IOSA	IATA Operational Safety Audit
NLR	Royal Netherlands Aerospace Centre
RBO	Risk Based Oversight
SAFA	Safety Assessment of Foreign Aircraft
SB	Safety Division – Flight Operations
SG	Secretary General
SI	Safety Division - Infrastructure
SM ICG	Safety Management International Collaboration Group
SMS	Safety Management System
SSP	State Safety Plan
ST	Safety Division - Aircraft
STSB	Swiss Transportation Safety Investigation Board
UK	United Kingdom

1 Introduction

1.1 Background

This report is an external review on the safety supervision capability of the Federation Office of Civil Aviation of Switzerland (FOCA). The immediate motivation for this review was an accident on 4 August 2018. A historic Junkers Ju-52 aircraft with registration HB-HOT crashed in alpine terrain during a flight from Locarno aerodrome to Dübendorf military aerodrome in Switzerland. The aircraft was completely destroyed and all twenty occupants were fatally injured. The investigation report of the Swiss Transportation Safety Investigation Board (STSB) suggests that the FOCA's oversight activities in relation to historic aircraft may have systemic deficiencies. In order to examine whether the supervision of Swiss civil aviation has systemic deficiencies, the Federal Department of the Environment, Transport, Energy and Communications (DETEC) requested an external review by the Royal Netherlands Aerospace Centre (NLR).

In 2003, NLR conducted an extensive evaluation of the safety of air transport in Switzerland. This evaluation resulted in 28 recommendations for improvement. A post evaluation audit was conducted in 2006 to assess the status of the recommendations. NLR has conducted many other reviews and studies into aviation oversight. NLR is thus well positioned to conduct the external review that was requested by DETEC.

1.2 Goal of the study

The objective of this review is to determine whether the FOCA supervision of Swiss civil aviation has systemic deficiencies, and to provide appropriate recommendations if necessary.

1.3 Scope of the study

The study considers FOCA's safety supervision of flight operations and airworthiness of civil aviation. Activities relating to infrastructure, aviation development and the FOCA's cross-sectional tasks are not analysed. The deficiencies in the category of historic aircraft mentioned in the STSB report are not addressed.

For this study, a systemic deficiency is defined as a deficiency experienced by the whole of the supervision of Swiss civil aviation and not just particular parts of it. See also section 1.5.

1.4 Study approach

Systemic deficiencies can lay in the way in which the supervision is organised or in the way the supervision is executed. Therefore both the organisation and the practical execution must be investigated. Whereas the organisation can be analysed by considering relevant documentation, analysis of the practical execution is less straightforward. The practical execution can be identified by interviews with relevant personnel in combination with

outcome data. A single interview can at best provide anecdotal evidence. Therefore the study approach has been to use of a variety of methods for collecting information on the same topic so that a sufficient body of evidence is obtained.

The complexity and sensitivity of this evaluation, where multiple functions and individuals are involved and opinions may differ, requires a well elaborated and solid approach to build up the fact basis of the analysis. The data collection method puts emphasis on concrete and triangulated fact finding based on three pillars:

- Desk research; the collection of reported facts from relevant documentation,
- Field research; the collection of the experience and viewpoints of various functions and individuals by means of semi-structured interviews.
- Comparison with oversight practices in other national authorities.

Documents for the desk research included documents (reports, letters, minutes of meetings, etc) and inspection activity data from FOCA, documents obtained from third parties and various documents that are publicly available.

Interviews were conducted with representatives from FOCA, DETEC, STSB and the Swiss aviation industry.

Information on aviation safety oversight activities in other European states was obtained from publicly available information and interviews with representatives of civil aviation authorities of the Netherlands, France, the United Kingdom and Sweden.

1.5 Definitions

This evaluation contains terms on the basis of definitions provided below.

Safety oversight. A function performed by a State to ensure that individuals and organizations performing an aviation activity comply with safety-related national laws and regulations.

Surveillance. The State activities through which the State proactively verifies through inspections and audits that aviation licence, certificate, authorization or approval holders continue to meet the established requirements and function at the level of competency and safety required by the State.

A *deficiency* is a state of not having, or not having enough, of something that is needed. A *systemic deficiency* is a deficiency experienced by the whole of the supervision of Swiss civil aviation and not just particular parts of it. Systemic concerns the interrelationships and interconnections between and within systems. Therefore, in order to determine if the oversight of Swiss civil aviation has systemic deficiencies we first must look at what is needed for aviation safety oversight and then determine whether the things that are needed are sufficiently present. Subsequently we must determine if any identified deficiencies are confined to particular parts of the safety oversight or if these deficiencies apply to the whole of the supervision.

It is important to mention a subtle but important difference in the use of the word 'Systemic' in the STSB report on the HB-HOT accident and in the assignment given to NLR for the current study. The STSB report does not provide a formal definition of the meaning of the word 'Systemic'. The text of Paragraph 2.1 ('Structure of the analysis') provides some explanation: ... *The third step is to evaluate the systemic aspects, i.e. the underlying reasons as to why it was possible*

for this accident to happen. Aspects that are generally considered ‘Systemic’ are, among others, organisation, management and oversight, as is also reflected in paragraph 2.4 on ‘Systemic Aspects’ in the STSB report¹. As used by STSB, ‘Systemic’ issues are thus a category of issues or factors that are systemic by their nature. Even when there are no deficiencies, these topics are still ‘Systemic’. If for example, a local deficiency exists in the Safety Management System of one single operator, it is a, according to the STSB, a systemic issue, even though the deficiency it is not wide-spread or even present beyond this one operator.

This distinction is important when interpreting the mandate for the present study. The meaning of the word ‘systemic’ in the mandate *‘to inform the Client whether there are systemic deficiencies in the oversight activities of the FOCA’*, is different from the meaning of ‘systemic’ in the STSB report. In STSB terms, safety oversight (by FOCA) is ‘systemic’ by definition. The STSB report does not claim that the deficiencies found in the HB-HOT accident are wide spread, across FOCA’s oversight activities in other parts of the Swiss aviation system. From that perspective, the word ‘systemic’ (deficiencies) in the mandate for the present study has another meaning. Here, ‘systemic’ should indeed be read as ‘wide-spread and structural’.

¹ STSB uses the word ‘Systemic’ in a slightly different manner than is suggested in the definition of ‘Systemic Issues’ by EASA: Systemic issues are system-wide problems that affect aviation as a whole and play a role in accidents and incidents.

2 Description and evaluation of Swiss civil aviation oversight

This section contains a description of safety oversight of civil aviation in Switzerland, and observations concerning safety oversight that were made during the course of this analysis. Following a description, including observations, of institutional arrangements and governance, the section is structured around four tasks of safety oversight that are derived from the standards and recommended practices of ICAO:

- Monitoring of safety performance;
- Verifying compliance with applicable safety regulatory requirements;
- Response to findings or observations of oversight activities;
- Safety promotion;
- Generation, maintenance and utilization of safety oversight records.

2.1 Institutional arrangement and governance relevant to safety oversight

This section looks into the arrangement and interaction of the Office of Civil Aviation (FOCA), the Department of the Environment, Transport, Energy and Communications (DETEC), and the Federal Assembly, from the perspective of the oversight of Swiss aviation.

The Swiss Parliament, consisting of the National Council and the Council of States, meets four times per year, for three-week sessions. The parliamentary work is thus not necessarily a full-time occupation. The members of the Swiss Parliament are not full-time politicians² and many members have professional activities next to their role as a parliamentarian. This brings obvious benefits with regard to the connection between the members and society at large and politicians bringing hands-on expertise to debates. It also means that members are more closely connected to the various interests in society. When looking at aviation for example, at least seventeen members National Council have entered their involvement with various aviation related organisations in the Register of Interests. Interests range from membership of pro-airport groups and groups looking after the interests of people living around airports, to the leadership of associations representing various groups in the aviation community in Switzerland. While that is simply a feature of the way the Swiss government is organized, it does seem to give aviation interests a more direct influence in political decision making and hence in the functioning of the Departments and Offices. Where interest groups lobby members of Parliament to influence public policy in most states, interests are – to some extent - represented within parliament in Switzerland.

At a more general level, the trends and priorities present in Swiss society at large are reflected in the parliamentary proceedings as well and find their way to the priorities and policies of the various Departments. One such trend of particular relevance to aviation is the increasing concern around climate change, quality of life and the impact of aviation. The necessity and urgency of making more sustainable choices in all aspects of life is widely felt and aviation is no exception. Various interviewees noted that, as a consequence, the balance between economy, sustainability and to some extent even safety of aviation in Swiss policy is shifting.

² There would seem to be a trend towards more time being spent on parliamentary work by the members of Parliament, to the extent of members being full-time parliamentarians. Also, the number of procedural requests tabled by members has almost tripled over the last 20 years.

While Parliament is the highest authority in Switzerland and hence has the ultimate say in all aviation related matters, Switzerland is also a Member State of ICAO and, since 2006, the European Aviation Safety Agency (EASA). Consequently it is committed to implement European Union (EU) aviation safety legislations into the domestic legal system. The introduction of EU(EASA) law has changed the influence of parliament on aviation. Unlike for other legislation, parliament cannot handle requests for changes of EU aviation safety rules using a 'motion'. A large part of the standards and regulations for aviation applicable to Switzerland are thus issued by ICAO and the EU. Both EASA and ICAO conduct regulatory audits in Switzerland to check the current implementation status. The FOCA adopts these regulations and, as the statutory supervisory authority, monitors compliance with them. That means that decision making and finding balanced agreements at the political level, must be achieved within the limits posed by the relevant international regulations. Hence, while Swiss policy makers are accustomed to having a fair amount of autonomy to take decisions at the national and local level, that does – to a large extent – not apply to aviation. Instead, Swiss politicians and policy makers alike are bound by extensive and complex ICAO and EASA standards and regulations, and FOCA occasionally finds itself in the role of explaining the nature and extent of international obligations, sometimes to the frustration of all involved.

The Federal Department of the Environment, Transport, Energy and Communications (DETEC) deals with infrastructure and environmental matters. All modes of transport, communication networks and the power grid all fall under its remit, as well as issues relating to the environment and health and safety. These responsibilities do occasionally bring about conflicting objectives and the ability to deal with such circumstances within a single department is therefore an important quality of the leadership. The heads of the seven Departments together constitute the Federal Council, which forms Switzerland's government. Members of the Federal Council may also serve one-year terms as President of the Confederation. In 2020 the head of DETEC served as President, adding a range of State level duties to the task of heading the Department and serving on the Federal Council.

In practice, the head of DETEC primarily serves in a political capacity and the operational management of the Department and the Offices belonging to the Department is conducted by the Secretary General (SG) who is also the department's chief of staff. The SG coordinates the activities of the seven Federal Offices within DETEC, prepares Federal Council business, assists with policy planning, liaises with parliament and handles internal and external communication. The SG also manages DETEC resources and represents the owner in dealings with various service providers including Skyguide, SwissPost, SBB, and Swisscom. In that capacity it is also the SG's responsibility to ensure that strategic objectives set for these organisations by the Federal Council are achieved. Moreover, nine administrative bodies report directly to the SG, including the Swiss Transportation Safety Investigation Board (STSB). In view of the very large span of control of the SG as described above, it is obvious that the SG cannot spend much time on any day to day governance of the (individual) Offices. The number of staff at the department dedicated to the management and oversight of the offices is very limited as well.

With regard to aviation, one function in DETEC is primarily tasked to look after the functioning of Federal Office of Civil Aviation (FOCA). This Civil Aviation Safety Officer (CASO) was established after the NLR (REACH) study in 2003 in order to *strengthen the ability of DETEC to give guidance to FOCA, to monitor the performance of FOCA on a regular basis and to act on behalf of the Swiss government in state level aviation policy matters*. Currently the future focus of this function is being reviewed and new staff has been hired. This function is embedded in a newly formed Safety Office that is tasked to perform multi-domain risk management (transport, aviation, communication, energy and environment) related to the offices under the responsibility of DETEC. The specific CASO function, as such, therefore disappears and potential aviation safety issues will be brought to the attention of the SG by the Head of the new Safety Office, as part of multi-domain risk management. It is too soon to assess whether this new organisation is sufficient to fully perform the previous CASO-function. This will have to be evaluated at a later date, when the

functioning of the Safety Office has established itself. However, from a wider safety management perspective the formation of a multi-domain Safety Office within DETEC, with the aviation domain as an inherent part thereof, appears a promising concept.

The Federal Office of Civil Aviation (FOCA) is responsible for the supervision of civil aviation and for aviation development in Switzerland. It is one of the seven Federal Offices of the Department, with FOCA being one of the smaller offices in terms of budget and number of employees. FOCA has multiple responsibilities as it is responsible for both the development and the supervision of civil aviation in Switzerland, ensuring that Swiss aviation is optimally linked to international hubs, meets high safety standards and develops in a sustainable fashion.

With the responsibility for the safety, economy and sustainability of civil aviation and the associated policies residing in the Office, the time available to the SG to look after the Office being extremely limited, and the number of staff at the Department dedicated to FOCA being minimal, it is clear that FOCA functions largely autonomously. This is not unique to FOCA. Other Offices enjoy similar autonomy and fits in the general approach to governance in Switzerland. According to the Department, this arrangement has been functioning quite well, and it makes the organisation simpler. The fact that the link between the Department is at 'arm's length' does not mean that the SG is not sufficiently aware of the relevant developments in the aviation domain, but closer attention is primarily paid in case of politically sensitive matters.

According to Art. 42 Para. 2 of the Government and Administration Organization Act (RVOG) of March 21, 1997, the General Secretariat has to perform supervisory functions in accordance with the guidance of the Head of Department (the Federal Councillor). The General Secretariat has strong confidence in the ability of FOCA to carry its mandate and in its performance regarding oversight. At the same time the Department feels that it is not realistically feasible to be entirely sure of the latter, since the Department does not possess the necessary expertise to judge that. Hence, the performance of FOCA on the oversight tasks is not systematically overseen by the Department itself. With regard to regulation and oversight, the Department relies on the periodic audits by EASA and ICAO and with regard to aviation policy the Department does occasionally engage third party expertise.

DETEC provides the budget of FOCA. Goals and objectives for FOCA are established on a yearly basis ("Leistungsvereinbarung") but these are not considered the main steering instrument. The main means of interaction with the Office are bi-weekly meetings with the head of DETEC – the Federal Councillor, the SG and the DG of FOCA and their staff. This meeting is where politics meets the role of FOCA, where the department must balance the various responsibilities in its remit (environment, transport, energy, communications and also health and safety) and give meaning to the priorities agreed upon in Parliament.

On paper, this should not present particular difficulties as both the Federal Councillor and SG and the DG of FOCA are responsible for looking after safety, economy and sustainability. But in practice, only the DG of FOCA is specifically representing aviation and has the necessary knowledge and experience to consider the possibilities, limitations and obligations related to national and international aviation standards and regulations. In such situations it can be difficult to discern between a strong stance for safety, a strong stance for aviation, a reluctance to compromise on safety, insufficient sensitivity for the political considerations, etc. on the part of the Office.

The Office itself would welcome closer scrutiny on the technical and operational aspects of discussions with the Department and believes that it will benefit the Office to be challenged more by the Department, but the aviation specific background to do that is not sufficiently available at the department. As a consequence of the circumstances and conditions described above, and while the importance of safety is recognized by all, in discussions and decision

making, the Federal Councillor and the general secretariat tend to be focussed on the political and environmental aspects. The Office – while it is responsible for aviation policy and for balancing safety, economy and sustainability - finds itself in the position of primarily shedding light on the aviation- and safety specific considerations.

The final aspect of the institutional arrangements and governance around safety oversight in this section concerns the fact that FOCA is not only responsible for aviation safety (regulation, oversight and enforcement), but also for aviation policy, and how that affects the work of FOCA in oversight. This dual tasking is not common in other states, where the responsibility for aviation policy usually resides at the Department/Ministry. Reasons for the separation between oversight and policy in other states are that oversight and policy may sometimes have conflicting objectives and that effective oversight requires non-negotiable references – also in risk-based oversight. For most other authorities, the aviation policy is part of the relevant context and constraints for their oversight work. Aviation policy has however been part of the responsibilities of FOCA for decades and the current organisational structure of FOCA provides for some separation between both responsibilities as the policy functions and the safety functions are located in separate sections. As also noted in the audit report³ on the 'Prüfung der Governance und der Aufsicht über das Luftverkehrsmanagement' by the Swiss Federal Audit Office (EFK) however, the separation between policy and safety oversight is, in practice, not always clear. The 2019 EFK audit found that various FOCA planning documents (vision and strategy, strategic orders of the departments) contain conflicting goals, or do not provide strategic solution for the delimitation of supervision and other tasks of the FOCA. When looking at the policies reflected at the current FOCA (2021) website, the page on 'Strategie und Leitbild' states that: 'The Federal Office of Civil Aviation (FOCA) strives for a high level of safety and sustainable development in Swiss civil aviation', suggesting that safety and sustainability are equally important. The page on 'Sicherheitskultur' states that 'Under the motto "safety first", FOCA strives to ensure the highest safety standards that can be measured amongst the best in Europe', suggesting that safety takes precedence. On both pages, further considerations regarding safety, economy and sustainability are provided, so they are not in contradiction in a general sense and indeed, it is conceivable that the strategy is pursued as stated while giving precedence to safety. But nevertheless, goal conflicts could still occur.

When looking at the overarching legal basis and the policies of the department the conditions are quite clear. Article 108a of the Civil Aviation Act states that the Federal Council lays down the basic requirements for aviation safety, taking into account the international (ICAO and EU) regulations that are binding for Switzerland, the state of the art and economic viability. So within the binding regulations, safety needs to be balanced with economic considerations. In the policies of the Department there is an explicit need to balance safety with sustainability as well, in accordance with decisions in Parliament. In the interviews with personnel of the safety divisions of FOCA on the other hand, and also when looking at the various strategy and tasking documents of FOCA, it appears that the focus is really on safety only. No indications were found of regular interaction between the safety sections and the policy section in this regard. That means that possible conflicts between policy and oversight meet at the level of the management of FOCA and the task of balancing safety, economy and sustainability is primarily conducted there.

It is important to stress that economy and sustainability considerations affect safety oversight in any aviation authority, not only at FOCA. After all, safety can never be considered in isolation as it is not the purpose of aviation. In fact, ICAO recognizes the increasing demands from society and states: "Political will is essential to the sustainability of a state safety oversight system. A number of factors that are in play underline the importance of renewed commitment and political will on the part of governments including increasingly intense social, economic, political, environmental and other pressures on civil aviation policy, particularly at the national and regional levels. States should carefully consider the public interest. Obligations related to safety should not be compromised". ICAO

³ EFK-18445 - FinDel D6/2019 - 23 Oktober 2019.

connects the need to balance the various interests to the political level and the state. While the aviation authorities are a state agency, their responsibility is understood by most authorities to primarily concern the 'Obligations related to safety should not be compromised'. The fact that FOCA is also responsible for aviation policy and formally tasked to ensure an appropriate balance between these potentially conflicting objectives is uncommon from an international perspective. It may have consequences for the relationship between the inspectors and management and the compliance behaviour of regulated organisations. This will be further contemplated in section 4.

Based on all interviews held throughout the governance chain, it is significant that none of the interviewees expressed concern about the ability and conduct of the Office in discharging of its responsibilities regarding safety oversight. On the contrary, all interviewees have confidence in the safety oversight by FOCA. At the same time, several interviewees mentioned cases in which – in their view - the Office did demonstrate (too) little preparedness to compromise on safety or insufficient sensitivity to the political context when trying to find a compromise. While maintaining a suitably harmonious relationship with the regulated organisations is important for effective oversight, it is also important for an authority to take a strong professional stance on safety. Since this review is not about the policy making role of FOCA but about the safety oversight by FOCA, these are noteworthy observations.

In summary, the main observations in this paragraph 2.1 on the institutional arrangements and governance are:

- Through parliamentary representation, aviation interests in Switzerland have a more direct influence in political decision making and hence in the functioning of the Departments and Offices than in other states.
- The balance between economy, sustainability and to some extent even safety of aviation in Swiss policy is being shifting towards a more important role of sustainability.
- While being accustomed to having a fair amount of autonomy to take decisions at the national and local level, Swiss politicians and policy makers alike are bound by extensive and complex ICAO and EASA standards and regulations.
- Due to the very large scope of work of the Department and the minimal staff dedicated to aviation, DETEC is not in a position to oversee the work of FOCA other than at the political level. The department does have strong confidence in the oversight by FOCA, also based on EASA and ICAO audits.

2.2 Monitoring of safety performance

General description of this oversight task⁴

Safety policy and safety performance monitoring are logically connected. The safety policy is the basis for safety objectives, while the safety objectives are the basis for safety performance monitoring.

Monitoring of safety performance can be defined as the process of gathering safety data from various sources and processing this data to safety performance information, such that a comparison can be made of the perceived safety performance level with a given safety target or objective. Safety performance monitoring is executed by a combination of an outcome oriented approach and a process oriented approach. The outcome oriented approach is based on monitoring accidents, incidents and occurrences, the process oriented approach is based on monitoring functions and activities, compliance to regulations, and Safety Management System (SMS) implementation. In both

⁴ Sources ICAO Annex 19, ICAO doc 9859.

approaches, safety performance data is collected to determine safety performance indicator values which are used to ascertain whether safety performance targets and safety performance objectives are met. Implicitly the safety performance monitoring process rests on three pillars:

- Gathering of safety data
- Processing safety data
- Comparing the safety performance with targets and objectives.

The outcome of the safety performance monitoring process is the basis for well-informed safety decision-making with regard to surveillance activities and safety in the State's aviation system.

Observations

The functioning of the safety performance monitoring process has been reviewed based on information provided by key players both at FOCA and in the aviation sector. The main focus of this review has been on assessing potential systemic deficiencies. However, where relevant, operational or emerging issues also have been taken into account.

Collection and processing of safety data

There are various sources of safety data available to FOCA:

- Results from audits and inspections
- Data from the mandatory reporting system
- Data from voluntary reporting system
- Information and recommendations from accident/incident investigation reports from the STSB.

Results from audits and inspections are gathered and processed in a so-called "Ampelreporting" system. This is a high level reporting system that shows audit and inspection results, in the various domains (WLF, Technical, Operational and SAFA) in an easily accessible form. It provides a traffic light format (red/yellow/green) showing the perceived safety state of an operator per domain. In addition it provides safety trend information, background information and measures to be considered. If well maintained this system provides valuable information to inspectors to focus on specific weak spots and plan future activities. It provides also valuable management information to higher FOCA management.

Based on the requirements of the European Implementing Rule 2015/1018⁵, mandatory occurrence reports are gathered by FOCA. Mandatory occurrence reports should be made on amongst others near air collisions, bird strikes and dangerous goods non-compliances. All information about occurrences and incidents are entered in the ECCAIRS database and is placed at the disposal of the safety divisions of FOCA.

In addition, FOCA is encouraging voluntary reporting, by adopting "just culture" principles, in line with Regulation (EU) 376/2014⁶. These principles are further strengthened by the nomination of an ombudsperson, affiliated with DETEC⁷ to whom potential infringements against the principle of "just culture" can be reported. Despite these measures the amount of voluntary safety reports addressed to FOCA are very limited, in particular from the General Aviation domain. The latter is not a specific Swiss phenomenon but is observed in other states as well.

⁵ Commission Implementing Regulation (EU) 2015/1018 of 29 June 2015 laying down a list classifying occurrences in civil aviation to be mandatorily reported according to Regulation (EU) No 376/2014 of the European Parliament and of the Council.

⁶ Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation.

⁷ The Reporting Office for Just Culture in Civil Aviation – ROJCA.

FOCA notes all safety recommendations issued by the STSB. The recommendations, addressed to FOCA, are listed and progress in the follow-up of these recommendations is monitored. Each recommendation is assigned to an expert who is responsible for the actions in response to the recommendation, including an internal and external deadline for the action to be completed. Based on a recent version⁸ of the so-called SEKO-List (“Monitoring Sicherheitsempfehlungen in Bearbeitung”) it appears however that response to safety recommendations to FOCA takes in many cases extraordinary long periods of time: response times of 3 -7 years are no exception.

Based on the observations above it may be concluded that in a general sense all data sources available to FOCA to monitor safety performance are well managed and processed within FOCA. However, based on information of FOCA key personnel and the aviation sector, it may be questioned whether the safety picture at FOCA is fully accurate and comprehensive. A number of issues have been put forward in this context, i.e.:

- Too much focus on compliance rather than assessing the actual safety performance;
- Insufficient use of observations regarding the performance of Safety Management Systems of the aviation industry and their results.

Large aviation companies gather much more information concerning the safety performance of the company than FOCA. For instance they have flight data monitoring programs, gathering flight data on a routine basis and process and monitor these data, as an important input to their Safety Management System (SMS). Also there are substantial numbers of voluntary reports that do not fall under the mandatory system and are not shared with FOCA. However, these reports provide valuable information concerning the day-to-day safety performance. In addition the larger companies rely also on processed safety information, such as Event Severity Classifications, Safety Performance Indicators and Operational Risk Assessments. All this information represents elements of the SMS. However, this information is not systematically shared with FOCA. In general FOCA conducts audits (including on the SMS) once a year. Based on the information provided by industry, the SMS audits are mainly based on demonstrating compliance with the regulations. Audits do not assess the internal functioning of the SMS in depth, nor the safety picture arising from the SMS. It is regarded as a missed opportunity that the safety information from the company’s SMS is not used to get a better informed perception of the actual safety performance. This is considered an area where FOCA could improve by adopting performance based oversight principles. Both (the larger) operators and FOCA management seem to support such approach, because it may provide added value for both sides. However, a more active attitude is required to implement this in practice and auditors must be trained to apply a more performance based approach. Although FOCA conducts risk-based oversight (RBO), in reality it is to a large extent compliance based oversight. Several inspectors still focus on compliance over anything else.

In this context safety performance should not only be measured in concrete performance indicators, but should also take into account “soft” indicators, such as the internal safety culture. A healthy safety culture is an important element of a working SMS, and assessing the level of safety culture at an organisation requires a considerable amount of soft skills. These soft skills are not automatically well present in technically oriented safety oversight personnel. Technically talented personnel tend to be less inclined to acquire such skills. Just like other European aviation authorities, FOCA is in the process of developing skills and capabilities, including supporting tools for evaluating safety management and safety culture maturity. However this capability is not yet not fully operational. FOCA has developed an SMS guide to assess the level of maturity, based on Safety Management International Collaboration Group (SM ICG) material and has trained the inspectors. However this is not yet fully reflected in the inspection results. The information stays with the individual inspectors and is not yet integrated. Additionally, the results of a thorough safety management system review are typically documented as plain text descriptions. Reviewing the results of previous

⁸ SEKO-List of 17 August 2020

reviews can therefore be an elaborate task, and analysis across multiple reviews, e.g. to look for patterns or trends, is not straightforward. Proper assessment of the performance of safety management systems requires an occasional look at what is going on behind the safety management system.

The observations above mostly apply to the larger companies. The smaller companies have to comply in essence with the same regulations, but in general lack the capabilities for extensive safety monitoring, based on various data sources and data processing, as used by the larger companies. The volume of data generated is in general simply insufficient to enable meaningful performance based safety monitoring. Safety Management Systems of smaller companies will in this sense always remain less advanced. At smaller organizations in Switzerland there is less understanding of the importance of occurrence reporting. As a result, it is difficult for FOCA to develop a complete risk picture. The use of additional information (such as ADS-B data) to enhance the risk picture is difficult because of data protection restrictions. The gathering of meaningful data concerning the safety performance of smaller organisations is in general difficult and therefore FOCA has no other option than to mainly look at compliance issues at such companies.

This may lead to the perception in the aviation industry, that smaller companies are treated differently from the larger companies. In this context, during the review signals were noted of frustration at some smaller companies concerning their perceived unfair treatment in comparison with some larger companies. It is further noted that FOCA maintains in general harmonious relations with the larger companies, both at working level and management level. However, at least with some of the smaller companies, working relations are less harmonious and this may hamper the ability of FOCA to monitor the safety performance at these smaller companies.

2.3 Verifying compliance with applicable safety regulatory requirements

General description of this oversight task⁹

Surveillance activities are carried out by a State to proactively verify that aviation licence, certificate, authorization or approval holders continue to meet the established requirements and function at the level of competency and safety required by the State. These activities include the conduct of on-site inspections (announced and unannounced visits), the review of documents submitted by the service providers, meetings with concerned parties and analyses of available safety information.

All significant aspects of the operating procedures, safety measures, facilities and equipment should be reviewed within a defined timeframe specified by the State. The methodologies for the various types of surveillance activities should include provisions for classifying the findings resulting from the surveillance activity, based on their severity, as this classification will determine the type of follow-up and enforcement action by the CAA, along with the related timelines. It is critical that inspectors possess a high degree of integrity, are impartial in carrying out their tasks, are tactful, have a good understanding of human nature and are able to get along well with people.

The amount of acceptable means of compliance, alternative means of compliance, and guidance materials is an indication of the fact that assessing compliance is not always straightforward but may require interpretation. For

⁹ Sources: ICAO DOC 9734 Part A, ICAO Doc 8335, EASA web site.

oversight to be effective, it is important that this interpretation is consistent and harmonised across inspectors and the service providers.

In recent years, safety management system (SMS) have been introduced by ICAO and EASA as an important element to improve aviation safety performance. The introduction of SMS and the requirement for service providers to have an SMS brought in safety oversight of SMS as a task for the authorities. This concept of evaluating SMS effectiveness supports the move from traditional, compliance-based oversight to performance-based oversight.

Observations

FOCA has a strong legal department that has a judicial view on safety: compliance is a legal requirement and is a condition for a safe operation, and non-compliance may give rise to enforcement actions. This is in itself a justified approach for civil aviation authorities to ensure safety is maintained. However, at the same time it is a traditional approach that focuses on minimum acceptable safety standards. A more modern approach is to aim at higher safety standards, by also looking at the actual achieved safety level and identify measures or actions that could further improve safety. This is in general referred to as performance based oversight. European regulations move increasingly towards adopting performance based oversight practices. At FOCA this trend is being recognised at higher management levels, as it is for instance stated that “oversight can be done in a compliance driven way, but it is far more interesting to look at the safety level” and “being compliant does not make the operation safer”. However in the day-to-day practice the audits and inspections still largely focus on compliance.

According to aviation organisations, in particular at the larger companies, this leads to the perception that there is not much added value from audits.

EASA has been developing and updating regulations at an unprecedented speed. Keeping up with the regulations is difficult, especially for small organisations, who sometimes are short on personnel to track regulatory changes and perform accordingly. Much effort is spent on updating the paperwork such as the manuals. Industry, especially small organisations, needs lots of help in implementing regulations because of the amount of documents, the complexity and frequent regulatory changes.

The introduction of SMS has led to significant changes in the way safety is being assured by aviation organisations. Safety is no longer simply a matter of compliance. Aviation service providers are expected to be compliant and be able to identify and correct their own deficiencies. Larger organisation were, after considerable effort, able to set up effective SMS. However, some smaller organisations keep struggling with the topic. They often lack the manpower to properly establish a safety management system. They are also too small to learn from their own safety occurrences or flight data analysis.

The Swiss aviation industry can broadly be separated into a group of large companies and a group of small companies. The large companies (for example Swiss International Airlines, Edelweiss, Pilatus, Jet Aviation) are perceived by FOCA as not requiring much support in terms of providing guidelines and explanations of (international) regulation. These large companies organisations are embedded in an international context and are often part of a network or alliance. Within these networks there is exchange of information and practices. Sometimes safety audits are being performed through these networks, notably the IATA Operational Safety Audit (IOSA) of the International Air Transport Association (IATA). Large organisations are therefore not only under the scrutiny of FOCA, but of other organisations as well. For small domestic organisations this does not apply.

The smaller companies generally require more guidance. These companies sometimes have difficulties to cope with the continuous regulatory updates from EASA. Consequently they require relatively much support from FOCA in terms of providing guidelines and explanations of regulation. In oversight there seems to be a lot of paperwork, aimed at demonstrating compliance with regulation. There is a development away from checking the actual product (aircraft, operation, personnel, facility, etc.) toward checking the paperwork. This is not only seen at FOCA, but also at authorities in other countries.

With regard to the overall audit activity¹⁰ of FOCA, some trends are visible. Audit data from 2015 till 2019 shows that the annual number of audits of commercial aircraft operators (so exclusive of General Aviation) have declined from 240 in 2015 to 173 in 2019. Over the same period, the number of operators has declined from 74 to 43. So effectively, the number of audits per operator has increased. The total number of audits in the infrastructure domain (ATC and aerodromes) was 95 in 2015 and 54 in 2019, so it seems that oversight in this area has decreased. While part of that decrease may be due the fact that audits at Skyguide have been grouped together more, the general trend remains. In general aviation, a strong increase in the number of audits is visible, with 400 inspections in 2015 and 708 in 2019 (819 in 2018). Clearly, the effort of FOCA has shifted in that direction. For the organisations involved in maintenance & repair and security the annual volume of audits has been stable. Overall, the number of audits and inspections has increased.

In terms of experience, education and training, personnel of the safety departments of FOCA are well qualified to perform inspection and audit activities. Many have practical experience in the industry. There are sufficient opportunities for training. Workload can occasionally be high but is not perceived as excessive. Communication between employees of the safety divisions is limited. Employees are not fully aware of activities and working practices outside their division. There seems to be a considerable degree of compartmentalisation, both horizontally (limited exchange of information across divisions) and vertically (the inspectors do not have much contact with senior management, nor do they perceive a need for it). This is perhaps emphasised by a rather hierarchical working culture. The inspectors interact primarily with their direct manager (the head of their section) and the working relationship is good.

The Safety Risk Management (SRM) Division works together with the safety officers of the safety divisions to develop a risk picture and to share safety information. Although the purpose of having a dedicated safety officer in each department was cooperation, the interview results show that this is not yet fully achieved. Cooperation between the safety officers among themselves and between the safety officer and the safety risk manager can be improved. The compartmentalisation that is observed at the safety divisions does not support the exchange of safety information. Inspectors sometimes find it difficult to get safety data such as occurrence reports in preparation of audits and inspections.

While Switzerland has a relatively large aviation industry compared to other similar-sized States, the Swiss aviation sector is still small in terms of the total amount of people. Consequently, and as confirmed in the interviews, many people within the Swiss aviation sector know each other professionally. Many of the personnel at FOCA, including the managers, have worked in industry before joining FOCA. This is one of the reasons why FOCA inspectors are highly skilled and have a good understanding of the industry.

The policy for assigning inspectors to companies differs across the safety divisions. In some cases inspectors have been assigned to companies for more than five years. This means that FOCA personnel and management is well informed

¹⁰ VA 2022 mit IAFP 2023-2025: Leistungsinformationen (BAZL-012.24-2/10).

and has an in-depth knowledge and understanding of the industry as a whole as well as of the companies they oversee. However, adequate checks and balances must be in place to ensure that FOCA remains sufficiently critical, avoids regulatory capture and does not develop blind spots.

2.4 Response to findings or observations of oversight activities

General description of this oversight task¹¹

Effective and timely actions taken by the industry should result in the effective resolution of safety issues. However, in the absence of a resolution, the aviation authority should take the appropriate enforcement measures, such as the imposition of limitations, the suspension or revocation of certificates/licences/ approvals, or the imposition of financial penalties. Enforcement is any activity that is carried out in order to seek to effectively remedy a breach, or suspected or potential breach, of rules applicable to civil aviation.

The authority has a responsibility to the aviation organisations to be clear about when, why and how they will take action so that the aviation organisations know what the authority expects from them and what will happen in response to a breach of rules or regulations.

The spectrum of enforcement action ranges from collaboration and facilitation to advisory and finally formal enforcement tools, which also have an escalation scheme ranging from letters before action to prosecution. Effective enforcement is proportionate. The nature and degree of actions should be escalated as rapidly as necessary to secure satisfactory compliance.

It is good practice to treat those subject to enforcement action (whether individuals and organisations) in a consistent, traceable and predictable manner.

It is good practice to publicise enforcement actions in the interests of the consumer and the public. Publicising enforcement actions primarily serves to provide a transparent mechanism by which the authority can inform consumers and the public about the actions that were taken.

It must be accepted that, in some instances, enforcement actions may be overruled. This risk of challenge should not deter the authority from pursuing a course of action which the authority believes is lawful and will benefit consumers or the public. This is particularly so where enforcement action may ensure that any uncertainties or ambiguities in the applicable law are fully tested to the ultimate benefit of consumers, the public and the aviation community as a whole.

Observations

Findings or observations of oversight activities are classified, according to EASA directives, as follows:

- “Level 1 finding” is any non-compliance with EASA Regulations, which could lead to uncontrolled non-compliance’s with applicable airworthiness requirements and could affect the safety of the aircraft. Level 1 findings are considered most serious and concern any significant non-compliance with EASA regulatory requirements in particular, which could lower the safety standard and could seriously affect flight safety.

¹¹ Sources: ICAO doc 9734, CAP 1326.

- “Level 2 finding” is any non-compliance with EASA Regulations which is not classified as level 1. Level 2 findings may still be seen to lower the safety standard or may be a non-compliance to the Organisational Procedures.
- “Level 3 Observation” is any item where it has been identified, by objective evidence, to contain potential problems that could lead to a non-compliance. This level is designated as an observation, as it is not referring to an established non-compliances and thus does not meet the criteria to identify it as a “finding”.

FOCA follows this classification of findings. Any audit or inspection provides a de-briefing to the organisation audited/inspected. Findings are recorded and need to be followed-up within certain timeframes. A Level 1 finding will require immediate action. A level 2 finding leads to a corrective action within a certain time period and requires a root cause analysis. If the corrective action plan reveals that the time period until due date of the finding is too short for the operator, the due date may be extended upon judgement of the assigned inspector in coordination with the head of section.

According to the information provided by several parties (FOCA and aviation organisations) the relationship between auditors and auditees is in general qualified as harmonious and findings or observations can be discussed openly. Nevertheless, some signals were noted that smaller companies are treated more strict than the larger companies. However, objective proof that this is indeed the case could not be established within the present study.

In view of the educational and professional background of the inspectors and managers, it can be concluded that that oversight personnel in general is well experienced and in many cases have their roots in the aviation sector which in itself helps the acceptance and credibility of audit/inspection results.

A similar approach is followed, as in many other European countries, in which a spectrum of enforcement measures is applied, depending on the gravity of the finding. This may vary from guidance, verbal warnings, improvement directives, fines, to ultimately suspension of licences or certificates.

The organisation of FOCA reflects this approach of escalating findings. Each safety division has a dedicated Enforcement Department (STSS, SBSS and SISS) that is responsible for assigning fines to certain companies, in case a certain oversight result is escalated to that level. For more serious and repeated findings that could lead to revoking licences or certificates the Aviation Policy and Strategy department is involved, because the legal basis for such action would have to be well established and verified. The legal expertise for this assessment is mainly concentrated in this department.

In general it is concluded that FOCA is well organised, with sufficient and well qualified personnel, to ensure that appropriate actions are taken in response to findings or observations from oversight activities. However, despite this general conclusion, some critical remarks are noted with respect to the enforcement system.

As mentioned a particular escalation strategy is followed. However there appears to be no clear standardization or guideline concerning the appropriate sanction to be applied in a given case. It may depend on the particular background of the involved auditor or inspector. This may lead to the perception that some companies are sanctioned more strictly than others. In order to avoid such perceptions the enforcement strategies should be more harmonised within and among the safety divisions.

It was also mentioned that fines are not imposed very often, as it is perceived as an unpopular measure – being rather a penalty than an encouragement– to promote compliance with the regulations. Nevertheless, when it is decided to

impose a fine it should be effective. Therefore, the fine should be measured in relation to the objective of preventing further violations of the regulations. However, in some cases the imposed fines are too low to be effective. Examples were noted with respect to violations with drone regulations and with violations of the night curfew of airline operations. In the latter case airlines sometimes rather choose to pay the fine than bear the consequences of complying with the night restrictions. Therefore, it should be considered to refine the strategy of imposing fines as part of the escalation spectrum, such that the height of fines are in line with their objective and to harmonise this among the safety divisions.

2.5 Safety promotion

General description of this oversight task¹²

States should promote safety awareness and the sharing and exchange of safety information to support, within the State aviation organizations, the development of a positive safety culture that fosters an effective State Safety Plan (SSP). States should also promote safety awareness and the sharing and exchange of safety information with the aviation community to foster the maintenance and improvement of safety and to support the development of a positive safety culture. The aviation authority should ensure that accepted safety practices and proper procedures for the promotion of safety in operations are maintained.

Observations

An important aspect of safety promotion is stimulating a healthy safety culture within aviation organisations. In support of this FOCA published a statement on just culture in relation to the reporting of occurrences according to regulation (EU) Nr. 376/2014¹³. In the statement, FOCA declares “that the FOCA takes the necessary measures to ensure the confidentiality of the information received and to protect the personal data of the notifier. It may forward safety-relevant data obtained through the evaluation of the confidential information in an anonymised form, insofar as the data serve to improve flight safety. The EU and the FOCA are also calling on aviation companies to introduce the same 'just culture'. Employees who report on events must therefore not be disadvantaged by their employer”.

Several years ago, FOCA also invested in developing the capability to assess the safety culture. A safety culture assessment tool was developed and the relevant training was provided by an external organisation. However, this was discontinued. Safety culture assessment is by some inspectors still seen as secondary to verifying compliance. There is no emphasis on safety culture in the EMPIC tool that is used by FOCA to store the results of audits and inspections.

2.6 Generation, maintenance and utilization of safety oversight records

General description of this oversight task¹⁴

Safety oversight records can be used to support the identification of hazards which cut across the aviation system and as evidence of the efficacy of the surveillance activities performed. All records should be appropriately filed by the authority.

¹² Source: ICAO Annex 19 and Doc 8335.

¹³ Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation.

¹⁴ Source: ICAO doc 9734, ICAO Doc 9859.

The authority should establish and implement a system for record-keeping and filing. Records should include, but not be limited to, the following:

- completed checklists, evaluation reports and associated documentation, including, as applicable, safety assessments;
- minutes of meetings conducted as part of surveillance;
- follow-up reports on the implementation of corrective action plans.

Observations

Legislation and guidance for safety oversight records is generally straightforward, with the exception of records on the oversight of the 'soft' part of safety management and safety culture. This type of information is not easily captured in data and numbers and qualitative descriptors are not yet internationally harmonized.

The inspectors use the EMPIC software tool. The tool contains requirements, compliances, checklist and the inspection cycle. Audit reports and respective actions following findings are filed into EMPIC. The structure of the tool guides inspectors in a clear manner but there are no guidelines for the use of free text in the reports. There is no emphasis on safety culture.

In the past four years, FOCA developed an SMS guide to determine the level of maturity, based on SMICG material. Inspectors know well about maturity, but this is not yet well reflected in the inspection results. The safety divisions do not systematically integrate the information. This means that the collected information stays with inspectors only. Particularly for the oversight of the 'soft' part of safety management and safety culture, the inspector must have a good relation with the company so that there is mutual thrust to speak freely.

3 Aviation safety oversight in other European States

Information on aviation safety oversight activities and practices in other European states was obtained from publicly available information and interviews with representatives of civil aviation authorities of the Netherlands, France, the United Kingdom and Sweden. The information is presented in this chapter around the central themes that were used to structure the interviews.

Relation between policy and oversight

There is not a common way in which policy making and regulatory functions are combined with safety oversight functions among the consulted NAAs. In France, the National Oversight Authority (DSAC) monitors manufacturers, operators and aircrew. The Air Transport Directorate (DTA) develops public air transport policies in a European and international context. Both DSAC and DTA are part of the French civil aviation authority (DGAC). In the Netherlands there is a strict and formal separation between the oversight function and policy making and regulation. Policy and regulation is part of the ministry, while safety oversight is done by a separate organisation, albeit under responsibility of the minister. The benefit of the separation is clarity of roles and responsibilities, and less difficulty in maintaining the oversight role independent of policy and regulation. A disadvantage is the limited operational aviation knowledge at the policy department and the fact that the inspectorate sometimes is informed late of policy decisions. In the UK, policy development is done by the Department for Transport (DfT) and the CAA is a separate legal entity. In Sweden the Civil Aviation and Maritime department of the Swedish Transport Agency regulates and monitors civil aviation. Aviation policy development is done by the ministry of Infrastructure.

It is generally observed that because safety oversight is working daily with the aviation industry, they have a good view on the state of affairs and developments. They are therefore in a good position to provide feedback to policy development. It is also observed that a close connection between tactical policy making and oversight is beneficial for ensuring that the policies are aligned with the accountabilities of the oversight.

Independence and impartiality of inspectors.

To support objectivity and impartiality of safety oversight, a principle of rotating the assignment of inspectors to companies is commonly applied, but not all CAAs have formal procedures for this. A typical duration of an assignment is three years. Rotation of inspectors that are assigned to large airlines is less frequent than for small organisations. The stated reason is that it requires a long time to get to know a big and complex organisation to a sufficient level to perform oversight.

Some CAAs maintain a 'four eyes' principle, where all decisions of inspectors are independently checked by a second inspector. A yearly standardisation peer review is used by some CAAs as one of the measures to ensure that all inspectors stay sufficiently proficient and act in a harmonised way.

Other measures commonly applied are that inspectors take an oath when they are appointed, the existence of a code of conduct that addresses independence and impartiality, and a periodic (e.g. yearly) statement that must be made by employees of possible conflicts of interest.

Internal communication and sharing of information

All the consulted CAAs recognise that exchange of information, ideas and interpretations across inspectors is important for ensuring that inspectors can work effectively and remain competent. The way in which exchange of information is formally organised differs among CAAs. Informal exchange of ideas ('coffee conversations') is also recognised as a mechanism. Group meetings are used as a mechanism by all CAAs to exchange information. The organisation and participation of group meetings differs. Some CAAs organise meetings per organisational group, others organise meetings per topic, one CAA organised meetings for each company that is under surveillance and another CAA uses risk models as an instrument to structure group meetings. The goal of these meetings is generally ensuring a broad and common perspective, also to identify trends and topics of interest for audits and inspections. However, it was also mentioned by one CAA that apart from these meetings, the departments work mostly in isolation.

The organisations performing safety oversight in the Netherlands and Sweden also perform safety oversight of other domains, including rail transport and shipping. Although there are separate departments for the various domains, being part of one organisation has resulted in cross-fertilization, particularly at management level where sometimes shifts across domains take place. In the Netherlands, inspectors from other domains occasionally join the aviation inspector during company audits as observers. Other CAAs have very little experience with cooperation between inspectorates from other domains such as rail transport or nuclear power. Practical cooperation is recognised as an interesting idea, especially when it comes to the assessment of safety management, safety culture and governance.

Pressure from the industry

It is commonly experienced that the CAAs are challenged by the industry, or that the industry tries to influence decisions of the CAAs. This is not necessarily bad and is seen as one of the mechanisms that can contribute to continuous improvement. It is recognised that effectively dealing with challenges and pressure requires communication skills and competence. One CAA described that the attitude towards the industry has shifted from 'being a policeman' to being more cooperative. However, roles and responsibilities should be clear. Transparency was mentioned as an important element in maintaining a cooperative climate. Documenting all meetings and making those documents available to the parties involved helps to create such transparency. One CAA stated that if a company challenges the CAA on issues related to oversight, senior management will not deviate from the opinion of the inspector involved. At this CAA, as a general principle, meetings between senior management of a company and the CAA will include the inspector assigned to the company. Other CAAs have a practise of replacing the inspector in case of a conflict with a company. It is recognised that this must be done carefully so that it does not negatively reflect on the involved inspector.

Transition from compliance based to performance based oversight, including tools and skills

All CAAs are moving from compliance based to performance based oversight. To support performance based oversight, a variety of tools is used to identify 'risk profiles' of service providers. These tools combine different types of information to determine the risk profile of individual companies, and the frequency of inspection is based on the risk profile. Some CAAs also use the risk profile to select topics for more detailed inspection at particular companies. The risk profiles are generally based on 'hard data' such as company size, economic performance, number of audit findings, etc. Some CAA's also use 'soft factors' and professional judgement of the inspectors determine the risk profile. One CAA employs several human factors specialists that support the inspectors in developing soft skills, contribute to the preparation and interpretation of audits and inspections and in some cases, and only if approved by the organisation involved, are part of the audit team.

Enforcement

One of the CAAs stated that effectiveness of enforcement is about engagement. In most cases the industry wants to do the good thing in the good way. One of the key factors to prevent repetitive findings is a focus on the root cause rather than the finding itself. Inspectors must be prepared to challenge the corrective action being proposed. This is also an education process for the inspectors. Another CAA emphasised the ability to detect system level issues that may be the cause of findings.

All the consulted CAAs have some sort of escalation procedure with enforcement actions of increasing severity to coerce companies to comply with standards and regulations. Fines can be used by all consulted CAAs as possible enforcement action, but it was mentioned that these are not effective if the company that receives the fine already has financial problems.

4 Discussion

Safety oversight

The objective of the present study is to determine whether the FOCA supervision of Swiss civil aviation has systemic deficiencies. The observations and assessment regarding supervision by FOCA is presented in Chapter 2 of this document. Overall, it can be concluded that, despite some critical observations, the functioning of FOCA as an oversight organisation exhibits no systemic deficiencies. FOCA is staffed with highly educated personnel with a very high standard of expertise and experience in the aviation industry. Also the volume of staff and budget is considered sufficient for the size of oversight activities being performed. Monitoring of safety performance, verification of compliance, response to findings from oversight, enforcement and safety promotion and the management of safety oversight records are of a good level. Despite some organisational challenges, FOCA is functioning well as an oversight organisation and performs all tasks that are required to verify and manage the quality and safety of the activities within the aviation sector.

Our own findings are confirmed by the opinions expressed in the interviews. In the interviews, ranging across government, FOCA itself, the aviation industry, the STSB, CASO, and various aviation personnel associations, we have asked whether interviewees are of the opinion that there are systemic (system-wide) deficiencies in FOCA oversight. While most interviewees point at specific aspects of the oversight that could or should be improved, none of these interviewees is of the opinion that there are systemic deficiencies in FOCA oversight.

Although safety oversight is thus of a good level, there can still be vulnerabilities that may lead to risk when unchecked, particularly at the interfaces between FOCA and the various actors in aviation. The functioning of FOCA as an oversight organisation must also be regarded in that perspective. Organisation, staffing and available expertise are necessary conditions for performing effective oversight, but the ultimate objective to manage aviation safety to an acceptable level, with an aspiration of continuous safety improvement, can only be achieved by the efficient cooperation of all involved sector parties, including the Government and the associated ministerial department. Potential vulnerabilities in the entire aviation safety chain may lead to a gradual erosion of the safety functions that may be hard to notice from the day-to-day oversight activities, even if they are well organised at a local, or individual, level. Such gradual erosion may introduce risk and eventually lead to serious incidents or even accidents.

The next paragraphs look into possibilities for the further strengthening of oversight and the management of potential vulnerabilities, both within FOCA itself and in the wider aviation chain.

Relationship FOCA – DETEC

The dual responsibilities of FOCA for aviation safety and aviation policy, which is in accordance with the institutional arrangement and views on governance across the public sector in Switzerland, provides some practical advantages with regard to access to knowledge and simplified interfaces. But, as explained in section 2.1, it does make the role of the DG considerably more complex than in other states from an oversight perspective. For this reason and other reasons, these roles are split between an Inspector General¹⁵ and a Director General¹⁶ in most other states. The Department does not have the resources to oversee the role of FOCA in any detail nor to represent the aviation perspective at the political level. As a consequence, the Director General and his senior management, by virtue of the dual roles and the minimal aviation expertise at the level of the department, have an important role to play in (policy

¹⁵ Responsible for aviation safety oversight.

¹⁶ Responsible for aviation infrastructure and policy.

and) political discussions. At the same time, finding a new balance between aviation (safety), economy and sustainability is increasingly challenging. And the fact that interest groups, through parliament, have a more direct influence in policymaking in Switzerland, adds to those challenges. In all, this arrangement of responsibilities and resources between the Office and the Department, makes the role of the DG very demanding. In fact the DG himself, when assuming the new role of DG in 2016 commented that "In meiner vorherigen Aufgabe ... war ich vor allem mit Themen der Industrie und der technischen Regulierung und Aufsicht beschäftigt. Nun steht klar der politische Aspekt im Vordergrund meiner Arbeit." While this arrangement, as said, is commensurate with the way governance is arranged in Switzerland, it is a fact that – more so than in other states - multiple aspects of the job compete for the attention of the DG, with safety oversight being one of them. From that perspective, it is important to note that the task of finding a proper balance between safety, economy and sustainability does not make the FOCA and the DG responsible for the economy or for sustainability. But FOCA and the DG are responsible for aviation safety. Based on our review, it is clear that FOCA, and, in particular, the DG are well qualified to carry this responsibility and do so in an effective manner. But it remains important to ensure that the focus can stay on the primary responsibility for safety. And one necessary safeguard to manage that risk is to ensure that sufficient resources are available at the department with a dedicated focus on aviation and the aviation knowledge and experience necessary to fulfill that role.

Internal organisation of FOCA

Within FOCA both the policy and safety branch are embedded within a single organisation. This is, based on an international comparison, a rather unique set-up. Most States consider development of policies and strategies a responsibility of the Ministry of transport, under direct control and responsibility of the associated Minister. The benefit of the separation is clarity of roles and responsibilities, and less difficulty in maintaining the oversight role independent of policy and regulation. A disadvantage may be the limited access to operational aviation knowledge at the policy department and the fact that the inspectorate sometimes is informed late of policy decisions. Although FOCA houses both branches there is in principle no overarching objection against this set-up. To some extent it may even reap the benefits of both worlds as long as a clear separation between policy and oversight activities is maintained within FOCA.

The Safety Division of FOCA consists of three branches: Aircraft (ST), Flight Operations (SB) and Infrastructure (SI). This is a logical set-up, as long as it is recognised that safety issues often occur at the interface of aircraft characteristics, flight operations and the airport infrastructure. Therefore internal communication, exchange and sharing of viewpoints, best practices and safety information among the safety branches should be an essential part of the overall oversight activities. However, information gathered during the investigations indicated that communication between employees of the safety divisions is limited. Employees are not fully aware of activities and working practices outside their division. This compartmentalisation may lead to a narrow and incomplete view on the overall risk picture and the potential loss of 'weak signals'. As explained in the previous section, especially sharing of information on best practices regarding the assessment of safety management systems and safety culture, and the integration of data, including data on 'soft' factors like culture to build a complete risk picture are areas that can be improved.

CASO

The Civil Aviation Safety Officer (CASO) is one of the very few resources available at the department with a specific focus on aviation and with relevant aviation expertise. The CASO function has an important role to play in the ability of DETEC to oversee the functioning of FOCA by identifying risk in Swiss aviation, giving guidance to FOCA, and by monitoring the performance of FOCA on a regular basis. The present study identified that over the years, the resources available for the CASO function have been reduced and an additional management layer was added between the CASO and the head of the department. As a consequence, the impact of the role of the CASO has gradually eroded compared to its start in 2003. The person fulfilling the CASO function retired at the end of March

2021. The CASO function will be reorganised from 2021 onwards, covering five offices within the department instead of only aviation. The CASO function will be transformed from solely aviation safety management to multi-domain (transport, aviation, communication, energy and environment) systemic oversight and risk management. More resources will be made available and the focus of the new safety office will change. It is foreseen that the new Safety Office will assess on a systemic level if safety oversight is being done correctly. It will not focus directly on the performance and quality of oversight activities, but instead address prerequisites, like staffing, organisation, available expertise and independence. However, much of the new CASO role still needs to be developed. The number of FTE for the new Safety Office will be two at the start, and a further build-up is envisioned. This effectively means less resources dedicated to aviation than with the previous CASO. It is too early to establish whether the new set-up will be effective in managing risk for the whole department and all of its offices, but there could certainly be benefits in terms of the wider impact across the department as whole, for the further development of the maturity of risk management, and for cross-departmental learning. Hence, the set-up of a multi-domain (transport, aviation, communication, energy and environment) Safety Office within DETEC could be a worthwhile initiative, from which also aviation safety may benefit. In some countries, such as The Netherlands, there is experience with cross-fertilization among various transport modes. This experience is to some extent positive, because it enables the various domains to learn from each other's experiences. However, other parts of the previous role of the CASO, particularly as an intermediate between DETEC and FOCA and to monitor the performance of FOCA on a regular basis, can only partially be covered by the new Safety Office. So, on the one hand, the functioning of the new entity will have to be closely monitored in order to ensure that an essential safety feedback loop remains intact. And on the other hand, it needs to be assessed whether the removal of the dedicated CASO function is acceptable in view of the already minimal amount of resources at the Department with a specific aviation focus and expertise.

EASA

In 2006 Switzerland became a member of the European Aviation Safety Agency (EASA). Consequently it is committed to implement European Union (EU) aviation safety legislations into the domestic legal system. The introduction of EU(EASA) law has changed the influence of parliament on aviation. Unlike for other legislation, parliament cannot handle requests for changes of EU aviation safety rules using a 'motion'. This has led to some misunderstanding and has negatively influenced the reputation of FOCA.

EASA has been developing and updating regulations at an unprecedented speed. Much effort is required to update the paperwork such as the manuals. Industry needs lots of help in implementing regulations because of the amount of documents, the complexity and frequent regulatory changes. Keeping up with the regulations is difficult, especially for small organisations, who sometimes are short of personnel to track regulatory changes and act accordingly. In particular, smaller companies may perceive the EASA-regime as an overregulation, which can be counter-effective from a safety viewpoint. In this context FOCA could be more pro-active to support the smaller companies to remain compliant within the European regulatory structure. This is not a typical Swiss issue, as also in other countries similar experiences are noted. However, due to the relatively very large general aviation sector in Switzerland it may be perceived as a larger issue than in other European countries. Such support requires an open and transparent dialogue, with recognition of each other's roles and responsibilities.

Transition from compliance based oversight to performance based oversight

The transition from compliance based oversight to performance based oversight requires, in addition to the knowledge, skills and safety information system that are needed for assessing compliance, complementary knowledge, skills and safety information. As this performance based approach to aviation safety is new to all parties involved, it is a journey of discovery that requires frequent adjustments in order to be successful. These adjustments can be based on internal and external feedback. From the interviews with other European CAAs it is apparent that this

is a universal challenge. The European CAAs that were consulted mentioned several best practices that could be beneficial to FOCA as well. While FOCA has spent some effort in training inspectors in 'soft skills' and a tool for the assessment of safety management systems and recording the related results, FOCA seems to be lagging a bit in comparison with the best practices of other CAAs.

For the industry, the requirements for safety management systems and the associated safety culture are also relatively new, and just like the CAAs the industry is still learning. Large organisations typically have sufficient resources and a large network that help them to achieve a steep learning curve. FOCA can learn from this as well, if the attitude towards these organisations is reflective and challenging. Smaller organisations need much more guidance on this topic, and here is a role for FOCA as well. A questioning and reflective attitude from FOCA can help to provide the feedback to the smaller organisations that is needed for adjustment and further development of their SMS. This also supports FOCA in the development of skills and data acquisition and analysis techniques that are needed for a performance based approach.

Relationship FOCA with Industry

While Switzerland has a relatively large aviation industry compared to other States, the Swiss aviation sector is still small in absolute terms and in the total amount of the workforce. Consequently many people within the Swiss aviation sector know each other professionally. Many of the personnel at FOCA, including the managers, have worked in the industry before joining FOCA. In general harmonious relations are maintained, in particular with the larger companies in the sector and FOCA management regularly meets with the management of the (large) aviation companies. However, at least with some of the smaller companies, working relations are less harmonious and access to higher management levels at FOCA appears much more difficult. It is clear that this may hamper the interaction with these smaller organisations and the ability of FOCA to monitor their safety performance. This is an issue that will need attention of FOCA to improve the relationship with such companies and better explain the oversight policy regarding the smaller companies.

The policy for assigning inspectors to companies differs across the safety divisions. In some cases inspectors have been assigned to companies for more than five years. This means that FOCA personnel and management is well informed and has an in-depth knowledge and understanding of the industry as a whole as well as of the companies they oversee. However, adequate checks and balances must be in place to ensure that FOCA remains sufficiently critical, avoids regulatory capture and does not develop blind spots.

When the oversight organisation identifies itself with the interests and objections of the aviation sector, independent oversight is threatened. This is referred to as regulatory capture¹⁷, and is one of the factors that can contribute to what is called 'drift into danger'¹⁸ or 'drift into failure'¹⁹, where organisations slowly and unseen lose their grip on safety.

The aviation sector is in general a relatively small and connected community in most states, but it seems to be exceptionally deeply interconnected in Switzerland. This leads to influence of, and understanding for the interests of sectors and organisations at both the personal and organisational level. Both levels of influence are positive, bring many benefits and should be retained as assets for aviation in Switzerland. It is also one of the reasons why FOCA personnel is highly skilled, well trained and has a strong level of experience, probably more so than in other states.

¹⁷ Posner, R.A. (1974). Theories of economic regulation. Working paper No. 41. Center for Economic Analysis of Human Behavior and Social Institutions, National Bureau of Economic Research, New York.

¹⁸ Rasmussen, J. (1997). Risk management in a dynamic society, a modelling problem, *Safety Science* Vol. 27, No. 2/3, p. 183-213.

¹⁹ Dekker, S. (2011). *Drift into Failure: From Hunting Broken Components to Understanding Complex Systems*. CRC Press.

But also – perhaps more than elsewhere – it means that strong and impartial oversight relies on the judgement and ways of working of individuals. There are no clear signals of inadequate professional conduct or other indications that this is a problem. However, because of the deep interconnections in the aviation sector as a whole – including FOCA, a case could still be made for the necessity of additional organisational and/or procedural safeguards to be confident that any risks in this realm are identified timely and managed effectively. Open and non-judgemental discussions about practices and experiences can be beneficial to enhance best practices and avoid the development of blind spots. Transparency, both internally and externally, is an essential condition for this.

5 Conclusions

From the observations of our investigations we conclude that all elements of a state oversight system for civil aviation are in place and correctly organised. The system is working, and is in several aspects of world class quality, for instance the knowledge and experience of the personnel, staffing and budget levels. However, the oversight system is vulnerable to certain disturbances, which might be difficult to identify and which may have severe consequences. The safety oversight system can be particularly vulnerable when there is only a single line of defence against such disturbances.

1. There are no indications of the existence of systemic deficiencies concerning oversight of the Swiss aviation sector.
2. Resources in terms of budget and personnel are sufficient.
3. The technical and operational expertise of the inspectors is at a high level. The ability to properly interlock the combined competency can be improved. Due to compartmentalisation the available knowledge and information is not fully utilised. The ability to detect weak signals and trends can be improved by better internal communication.
4. Tools for the assessment of the maturity of safety management systems and safety culture can be improved. Proper assessment of the performance of safety management systems also requires an occasional look at what is going on behind the safety management system, amongst others to be able to identify operational drift and eroding safety margins.
5. The transformation of the CASO function to a multi-domain Safety Office will have certain advantages, such as opportunities for cross-fertilization (mutual learning from other domains). However, this also means that the task of providing a monitoring function and an independent feedback loop concerning aviation safety to FOCA and the decision makers at political level may be lost.
6. The relatively strong interconnections between FOCA and the civil aviation industry are advantageous as they contribute to the maintenance of harmonious relationships between FOCA and the industry. The level of aviation expertise and experience at senior management levels at FOCA is impressive and contributes to a good understanding of and harmonious relationship with the aviation industry. Such harmonious relationships are an important characteristic of an effective oversight system. However, while harmonious relationships are considered beneficial for the tasks to be performed, they might become an obstacle for maintaining sufficiently critical and independent towards the industry that is being supervised. While there are no clear signals of inadequate professional conduct or other indications that this is a problem, a case could still be made for the necessity of additional organisational and/or procedural safeguards to be confident that any risks in this realm are identified timely and managed effectively. Such a situation requires a system of check and balances to ensure that inspectors maintain critical and independent.
7. The relative independence of the FOCA from DETEC in combination with a changing political attitude towards aviation result in a setting in which political questions require a lot of attention from the FOCA management. This can perhaps lead to a condition where the surveillance and oversight tasks do not get the amount of management attention that is needed to keep performing at a high level.

6 Recommendations

As concluded above, no deficiencies regarding safety oversight in Switzerland have been identified that require immediate remedial action. But there are specific conditions and characteristics in the way safety oversight is organized and executed in Switzerland that leave the aviation system potentially vulnerable for risks that could go undetected until negative outcomes occur. Therefore, it is recommended to take several precautionary measures to ensure that emerging risks are identified and resolved in a timely manner. In addition, there are a few opportunities for improvement in current processes within FOCA. Our recommendations are aimed at improving the lines of defence such that 'defence in depth' can be obtained. This leads to the following recommendations.

1. Organise periodic evaluations of the oversight system with specific focus on:
 - a) Identification of possible unfavourable trends and emerging risks in the industry,
 - b) Monitoring of the performance of FOCA on surveillance and oversight tasks,
 - c) Feedback of the results of a) and b) to FOCA and DETEC.

It is recommended that a) is performed by the safety risk management section of FOCA. It is recommended that b) and c) are conducted by a third party and organised by the new Safety Office of DETEC.

2. Make sure that sufficient aviation related experience and knowledge remains continuously available at DETEC to facilitate effective interactions between FOCA and DETEC.
3. Make sure that assessments of safety management and safety culture are sufficiently critical and achieve sufficient depth. This requires the following:
 - An ability to combine information from different sources to be able to detect of weak signals. Better interlock the combined competency and available oversight information. Improve communication across safety divisions by actively organising exchange of technical and non-technical information.
 - Recognition of the importance of safety culture and therefore the capacity to be able to assess safety culture.
 - Further development of soft skills of inspectors (e.g. providing and receiving feedback, active listening, cultural intelligence, information skills).
 - Improve documentation of audit results on maturity of safety management systems.
 - Improve sharing of results of assessments of maturity of safety management systems and safety culture.
4. Improve checks and balances to make sure that inspectors are independent and impartial in their observations and findings:
 - Organise open discussions among personnel within and across the technical divisions on inspection techniques, results, observations and challenges. The aim should be to challenge each other, in a non-judgemental atmosphere, to find possible blind spots, to share best practices, and to strengthen a just culture.
 - Invite inspectors from other domains or from other states as observer to the audit and inspection process. Let aviation inspectors participate in safety oversight audits and inspections in other domain or other states. The nature of these observations should be non-judgemental and reflective.
 - To prevent 'operational blindness', see to it that personnel involved in audits and inspections are regularly (e.g. every 2 year) assigned to another service provider.

- Strengthen the Code of conduct section 7 'Wahrnehmung von Aufsichtsaufgaben' (performance of supervisory tasks) by providing clear descriptions of objective and impartial behaviour. See to it actively that personnel complies to the code of conduct. Openly discuss cases, in a non-punitive way, with the objective to collectively learn and to strengthen a just culture (see also first bullet point).
5. Improve checks and balances to make sure that inspectors are sufficiently critical in conducting audits and inspections. This concerns the attitude and the investigation technique. Especially when assessing the maturity of the safety management systems it is important to look beyond the paperwork.
 6. Be transparent towards own staff on communication between senior management of FOCA and industry.
 7. Ensure that the corrective responsibilities are fulfilled by a sanctioning system that is transparent, consistent, just and effective. An assertive approach with sanctions for obvious violations of rules and regulations provides a clear message to the industry.
 8. Improve, where necessary, the relationship with the smaller companies in the Swiss aviation sector. Support these companies actively to better understand the European regulatory framework and explain the corresponding oversight policy to these companies.

Appendix A Methodology and approach

A.1 Scope of the evaluation

For the purpose of this review, supervision is defined as the function by means of which a competent authority ensures that the applicable requirements are met by regulated entities.

Activities relating to infrastructure, aviation development and the FOCA's cross-sectional tasks are not analysed. The deficiencies in the category of historic aircraft mentioned in the draft STSB report are not addressed.

A.2 Key issues and evaluation criteria

The effectiveness of the FOCA supervision of Swiss civil aviation are investigated from the perspective of the way the supervision is organised and executed, and from the perspective of the impact it has on the relevant aviation organisations.

The organisation of the supervision looks into the governance, organisational structure, processes and people. This includes aspects such as resource allocation, competencies and skills -including soft skills- of personnel, tasks and responsibilities, and decision making. Cultural characteristics, such as the understanding of risk and its influence on supervisory tasks and resource allocation, are also investigated. The extent to which FOCA is able to create and maintain an intelligence picture with the appropriate level of detail is reviewed. The sanctioning and enforcement processes, including decision making, is also considered.

The impact of the supervision is determined by considering how the behaviour and safety performance of the regulated entities organisations is influenced by the supervision. The interaction between FOCA and the relevant aviation organisations, including mutual trust, is considered, as this is a vital factor in the effectivity of supervision. The extent to which set objectives are achieved by FOCA is verified.

A.3 Evaluation framework

An evaluation framework was applied to evaluate the supervision of Swiss civil aviation on the basis of critical, evidence-based judgement. This evaluation framework consists of the following parts:

1. What will be measured: this part comprises the main research question, which is broken down into sub-questions. Based on the sub-questions, it is defined what should be measured.
2. How is it measured: this part describes the sources that will be used to answer the research questions.

The evaluation framework helps to define the evaluation questions and to link evaluation questions to indicators and other inputs for evaluation. It also serves as guidance for the data collection and analysis process. The evaluation framework is presented as Appendix C.

A.4 Data collection method

The complex and sensitive nature of this evaluation, where multiple functions and individuals are involved and opinions may differ, results in the need to adopt a well elaborated and solid approach to build up the fact basis of the analysis. The data collection method puts emphasis on concrete and triangulated fact finding based on three pillars:

- Desk research; the collection of reported facts from relevant documentation,
- Field research; the collection of the experience and viewpoints of a the various functions and individuals,
- Comparison with oversight practices in other national authorities.

A.4.1 Desk research

Desk research involves the analysis of publicly available information and specific information disclosed to the study team.

A.4.2 Field research*Exploratory interviews*

With the aim to refine the understanding of the issues relevant for the evaluation and to assist in fine-tuning the analysis, five exploratory interviews were carried out. The aim was to feed the research team in the early stage of the study with insights from a variety of different functions relevant for safety oversight.

Targeted interviews

The collection of elaborate data and opinions as well as more sensitive information requires personalised engagement of relevant functions. The targeted interviews were conducted to engage with a variety of functions and individuals, as well as validate the key information acquired from the desk research.

A.4.3 Oversight practices in other states

Analysis of the practices of aviation safety oversight in other European countries.

Appendix B Activities

B.1 Exploratory interviews

Five exploratory interviews were carried out with representatives from FOCA, DETEC and the Swiss aviation industry. The primary focus of these early interviews was to explore general themes and experiences in order to further refine key issues for the evaluation and the evaluation framework.

B.2 Desk research

Documents for the desk research included documents (reports, letters, minutes of meetings, etc) and inspection activity data from FOCA, documents obtained from third parties and various documents that are publicly available.

B.3 Targeted interviews

Seventeen targeted interviews were carried out with representatives from FOCA, DETEC, STSB and the Swiss aviation industry.

B.4 Oversight practices in similar States

Analysis of the practices of aviation safety oversight in other European countries, including states that are comparable in size of the population and size of the aviation industry with Switzerland, was done through desk research and telephone interviews. ICAO guidelines (Safety Oversight Manual, Doc 9734) were used as a main reference for minimum requirements for a safety oversight system. Results from past NLR reviews provided information on the oversight capacity and practices, including practices for risk based oversight, of European States.

Appendix C Evaluation framework

Main research question

A statement should be made as to whether the FOCA supervision of Swiss civil aviation is effective in operational and technical terms and whether it complies with the legal requirements. For the purpose of this review, supervision is defined as the function by means of which a competent authority ensures that the applicable requirements are met by regulated entities.

Sub questions to answer the main question

View on supervision

- What are the applicable requirements?
- Are the applicable requirements clear to all parties (authority and regulated entity)?
- Is the interpretation of applicable requirements the same for authority and regulated entities?
- How is 'effectivity of supervision' seen by FOCA? Strictly in terms of meeting the regulations, or broader in terms of an overall goal of protecting society against risks?
- Is the view on effectivity of supervision shared by FOCA and DETEC? Is the view on effectivity of supervision shared across FOCA, horizontally and vertically?
- What is the process for ensuring that applicable requirements are met by regulated entities?
- How does FOCA verify whether the process for ensuring that applicable requirements are met by regulated entities is effective?
- Which safeguards are in place to detect and prevent 'regulatory capture'?

Data sources: Interviews with FOCA and DETEC management, representatives from supervised entities. Document analysis: Standards, regulations, guidelines and best practices from ICAO and EASA. National regulation. FOCA process descriptions.

Organisational aspects

- How are responsibilities and accountabilities within FOCA distributed?
- How many FTE's and how are these distributed within FOCA?

Interviews with FOCA management and personnel. Document analysis: Standardisation audit reports, FOCA meeting notes. Benchmark data.

Interaction between FOCA and DETEC

- Interaction between FOCA and DETEC: Purpose, processes, responsibilities and accountabilities, as seen from both organisations.
- How bilateral is the interface between GS-UVEK and CASO bilateral? (During NLR's analysis in 2006 it was considered to be somewhat unilateral; The given functions are delegated to CASO and are expected – and also perceived – to be performed well).
- To which extent is the safety information from the CASO processed and actually used at the level of the GS-UVEK.

Data sources: Interviews with DETEC and FOCA management. Document analysis: Meeting notes. Benchmark

Continuous improvement

- How are recommendations from the STSB handled?
- Which mechanisms are in place to facilitate continuous improvement?
- What is the interaction between the supervision and the SSP and resulting SASP?

Data sources: Interviews with STSB, CASO, FOCA management and personnel. Document analysis: STSB investigation reports, correspondence between FOCA and STSB. FOCA meeting notes.

Surveillance processes

- How does FOCA collect and integrate the information to determine whether applicable requirements are met by the regulated entities?
- Which competencies are needed to determine whether applicable requirements are met by the regulated entities?
- How does FOCA ensure that these required competencies are developed and maintained?
- Which information systems are needed to determine whether applicable requirements are met by the regulated entities?
- How does FOCA maintain an awareness of relevant trends, emerging problems, and the compliance levels they achieved in the industry?
- How does FOCA identify threats?
- How does FOCA compare performance against its goals?
- Which processes are used by FOCA to assess safety risks?

Data sources: Interviews with inspectors, heads and safety officers of safety divisions, representatives from inspected entities. Document analysis: FOCA process descriptions and manuals. FOCA surveillance plans, FOCA meeting notes. FOCA safety culture and job satisfaction assessment results. Standardisation audit reports.

Inspections and audits

- How are inspections and audits prepared within FOCA? Which competencies are involved, which information is used during the preparation, how are previous results (for the same entity) used?
- How is it ensured that inspections and audits achieve the required level of depth?
- How are best practices shared across FOCA?

Data sources: Interviews with inspectors, heads and safety officers of safety divisions, representatives from supervised entities. Document analysis: Audit reports, standards, regulations, guidelines and best practices from ICAO and EASA. Benchmark data



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For more information visit: www.nlr.org

Postal address

PO Box 90502
1006 BM Amsterdam, The Netherlands
e) info@nlr.nl i) www.nlr.org

NLR Amsterdam

Anthony Fokkerweg 2
1059 CM Amsterdam, The Netherlands
p) +31 88 511 3113

NLR Marknesse

Voorsterweg 31
8316 PR Marknesse, The Netherlands
p) +31 88 511 4444