

Samferdselsdepartementet
Norway

**A comparative study of
the Norwegian Civil Aviation Authority**

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the Norwegian Civil Aviation Authority**

Preface and Disclaimer

This report has been prepared for Samferdselsdepartementet (the Norwegian Ministry of Transport and Communication – MoTC) by Integra A/S.

Integra A/S is an independent Danish Consulting Agency providing strategic and operational advice to public and private organisations in the wider aviation industry segment.

This report has been prepared solely for the purposes stated herein and should not be relied upon for any other purpose.

Integra has not been required, or asked, to independently verify the accuracy of information provided to us by the participating agencies. Accordingly, we express no opinion on the reliability, accuracy, or completeness of the information provided to us and upon which we have relied fully in the establishment of the present report.

The statements and opinions expressed herein have been made in good faith, and on the basis that all information relied upon is true and accurate in all material respects, and not misleading by reason of omission or otherwise. We reserve the right, but are under no obligation, to review or amend this Report, if any additional information, which was in existence on the date of this Report, was not brought to our attention, or subsequently comes to light.

Oslo, August 2015

Executive Summary

Luftfartstilsynet (Civil Aviation Authority, Norway) has regulatory oversight responsibilities in relation to Norway's civil aviation system. It is the aim of the current report to determine whether the activities and functions carried out by the Luftfartstilsynet are executed in a cost-efficient way and with satisfactory effectiveness for to the Government, participants and users of the civil aviation system.

In the course of this review, all aspects of Luftfartstilsynet's activities were considered, but the main focus of this report and hence particularly the key findings focus on oversight functions and processes. For those areas of activity that were not assessed in more detail in this report, no specific findings and recommendations are formulated.

During the process, Integra identified certain ambiguities in the data collected, and in some cases, data have not been available from all participating authorities. However, all participating authorities have agreed to the use of the latest available data reported to EASA, through the Standardisation Information System, concerning the number of technical full-time employees (FTEs) allocated to the various aviation domains as well as the number of supervised aviation organisations and personnel in the various fields.

Key Findings

Based on the data provided, the key findings can be summarised the following way:

- ➔ Overall, Luftfartstilsynet is competitive and in line with comparable European civil aviation authorities (CAAs) in terms of cost-efficiency.
- ➔ In line with the 2010 OECD (Organisation for European Co-ordination and Development) report, assessing public sector Value for Money return¹, the present data indicate, however, that Luftfartstilsynet is operating comparatively labour-intensively. This is particularly valid for the oversight domains "Aircrew Licensing" and "Airworthiness".
- ➔ Experience from other CAAs shows that sharing certain support functions with other regulatory bodies can yield efficiency gains and reductions in the head count by up to 15%. Merged functions typically include the procurement and maintenance of IT infrastructure and systems, dedicated HR functions connected to the administration of an organisation or the base training of staff. Such a merger does not necessarily imply a co-location of regulatory authorities.
- ➔ The data provided indicates that in some more repetitive and administrative processes such as "Airworthiness" or "Aircrew Licensing", organisations operating a larger market

¹ Value for Money in Government – Public Administration after "New Public Management": OECD 2010

are able to achieve 'scale effects' and execute these core oversight processes more efficiently.

- In contrast to a wide held assumption, EASA activities have not reduced, but have rather tended to increase, the workload of the national CAAs. At the same time, EU regulations and the emerging of new technologies have established new tasks and competency requirements for national CAAs which, especially for smaller States such as Norway, can prove challenging due to requirements of having qualified experts in-house, a smaller industry to serve, etc. – an issue that was highlighted by the Norwegian stakeholders during consultations.
- The development of IT solutions is key to improving Luftfartstilsynet's productivity. For example, there is still untapped potential regarding online application forms or the electronic sharing of data with overseen entities. The replacement of unproductive paper processes by IT solutions is always bound to be positive for both the CAA and its users in the medium and long term, even if a short-term financial cost may be associated. It should be noted, however, that reduction of resources through increased usage of IT applications should not result in a reduction of technical experts or their competencies.
- The qualitative data collected for this report indicates that the roll-out of Risk Based Oversight (RBO) does not improve the efficiency of regulatory oversight, but rather improves its quality and effectiveness, as it allows the CAA to make a better, more targeted use of existing resources.

Recommendations

Based on the findings of this report, the following recommendations should be considered for the Norwegian context:

- Internal processes, particularly in those domains where Luftfartstilsynet is operating comparatively staff intense and less efficient than the benchmarked organisations, including Airworthiness and Aircrew Licensing should be reviewed.
- An assessment of the option to share certain corporate functions with other regulatory bodies – ideally under the umbrella of Samferdselsdepartementet – such as IT-procurement and HR management should be made. Such a sharing of functions/services does not necessarily need to result in a co-location.
- A cooperation with Nordic CAAs could be a way to achieve scale effects and high level competencies in certain aviation domains and should be assessed. Given the harmonised regulatory framework in Europe and the global technological development, a co-operation with Nordic CAAs could yield scale effects, which allow for a more efficient conduction of standardised oversight processes of high quality.
- In addition, Luftfartstilsynet should develop and maintain a comprehensive and robust safety data analysis process, which underpins implementation of Risk Based Oversight (RBO). Related IT tools and the training of staff are essential enablers and will need to

be funded adequately. As a benefit, the aviation operators having a low risk profile will take advantage from a lower administrative burden.

- Competency requirements based on EU/EASA regulation should be addressed through solutions that include the voluntary transfer of Luftfartstilsynet's tasks to EASA, an enhanced cooperation between CAAs (e.g. in context of Functional Airspace Blocks (FABs) or the use of qualified and certified entities.
- The development of IT solutions is seen as key to improving Luftfartstilsynet's productivity, and the timeline for doing so should be tightened. For example, there is still untapped potential regarding online application forms or the electronic sharing of data with overseen entities. The replacement of unproductive paper processes by IT solutions is bound to be positive for both Luftfartstilsynet and its users in the medium and long term, even if a short-term financial cost may be associated.
- In order to make better use of resources while improving quality and effectiveness, increased application of RBO across the aviation domains should be considered.

Table of Content

Preface and Disclaimer	2
Executive Summary	3
Table of Content	6
1. Introduction	8
1.1. Objectives and remit of the project	8
1.2. Legal framework	9
1.3. Aviation safety oversight functions	11
1.4. Key challenges affecting aviation authorities	12
1.5. Selection of benchmarked authorities	13
2. Theoretical background	15
2.1. Assessing the efficiency & value for money of public sector organisations	15
2.2. Economy, Efficiency, Effectiveness	16
2.3. Benchmarking in the public sector	17
3. Project process and methodology	20
3.1. Methodology	20
3.2. Project phases and steps	21
3.3. Key performance indicators for quantitative analysis	23
3.4. Key processes selected for qualitative analysis	24
4. Luftfartstilsynet	26
5. The benchmarked authorities	31
5.1. Trafikstyrelsen – Denmark	31
5.2. Trafi – Finland	35
5.3. Transportstyrelsen – Sweden	38
5.4. FOCA – Switzerland	41
5.5. CAA UK – United Kingdom	44
5.6. Overview	48
6. Quantitative analysis	49
6.1. General overview	49
6.2. Aircrew Licensing	53
6.3. Air Operations	57
6.4. Airworthiness	59
6.5. Air Navigation Services	62
6.6. Aerodromes	68
6.7. Aviation Security	69
6.8. Safety Data Analysis	71
6.9. Support Functions	71
6.10. Other domains	72
6.11. Comparative analysis – Luftfartstilsynet and other Nordic CAAs	72

7.	Qualitative analysis.....	79
7.1.	Application of Risk Based Oversight as a methodology	79
7.2.	Use of information technology in the safety oversight processes	82
7.3.	Safety data collection, analysis and dissemination	87
7.4.	Civil emergency response planning and preparedness	89
7.5.	Procedures for ensuring staff competency	89
8.	Conclusions.....	91
	Appendix I – List of References	93
	Appendix II – List of Illustrations	94
	Appendix III – The Questionnaire	96
	Appendix IV – List of Comments and Actions Taken	111

1. Introduction

1.1. *Objectives and remit of the project*

Samferdselsdepartementet – the Ministry of Transport & Communications of Norway – commissioned Integra to perform a benchmarking study of Luftfartstilsynet – the Civil Aviation Authority of Norway.

Luftfartstilsynet is not solely a safety oversight body, but carries out tasks in connection with the development of regulations, analysis and international work that cannot be classified as safety oversight activities. A mechanism has been established by which costs associated with safety oversight related tasks, encompassing approximately $\frac{2}{3}$ of Luftfartstilsynet's budget, are financed through a system of fees, paid by the entities in the aviation industry. The sole exception to this is safety oversight activities related to aero-clubs and aviation sports activities, which are currently financed under the National Budget.

An evaluation of the mechanism for financing Luftfartstilsynet's safety oversight activities was carried out in the autumn/winter of 2012/13. The report concluded that the mechanism was in compliance with the guidelines published by the Ministry of Finance of Norway for financing through fees and public charges².

Even though the financing mechanism is in compliance with the guidelines, this does not ensure cost-effectiveness. The report therefore included a recommendation that an investigation be carried out to explore the degree to which Luftfartstilsynet performs its safety oversight activities in a cost-effective manner. This is important in order to ensure that the aviation industry does not pay a disproportionately high price for safety oversight services.

It was against this background that Samferdselsdepartementet initiated a comparative study of Luftfartstilsynet's safety oversight activities as the basis for assessing the potential for using less resources than currently without negatively affecting the quality of Luftfartstilsynet's services and the overall aviation safety level in Norway.

A comparison with safety oversight activities in other countries was deemed an important basis for analysing efficiency and identifying related "industry best practices".

It should be noted that the deregulation of the Norwegian market for terminal air navigation services provision is being discussed. However, the benchmarking will make a "snapshot" of the current situation and will not take into account the additional workload on Luftfartstilsynet, associated with such deregulation or with any other future development.

² Direktorat for Forvaltning og IKT, Statlige tilsyn – Ressursinnsats og finansiering, 2013

1.2. Legal framework

General aspects

The general, international legal framework for civil aviation stems from the ICAO Convention. Article 37 of the ICAO Convention binds all Signatory States to comply, as far as practicable, with the International Standards and Recommended Practices (SARPs) adopted by ICAO. However, ICAO Member States may opt out from SARPs by filing “differences” with the ICAO Council, pursuant to article 38 of the ICAO Convention.

At national level, ICAO Member States have transposed the ICAO requirements at two levels:

- the primary level being a civil aviation act that reflects the obligations contained in the ICAO Convention and in the relevant SARPs; and
- the secondary level being bylaws, reflecting the relevant SARPs.

The primary legislation is adopted at the level of Parliament, and the secondary legislation is established by the appropriate ministry or – after delegation from the ministry – by the civil aviation authority.

For EU Member States, the overarching legal framework is the EU aviation acquis that prevails over national legislation – and increasingly also provides for a uniform transposition of ICAO SARPs into the EU legal order.

The EU aviation acquis comprises:

- primary EU legislation (“regulations”, “directives”, “decisions”), proposed by the European Commission and adopted by the European Parliament and Council;
- secondary EU legislation (“implementing rules”), adopted by the European Commission, subject to the comitology procedure involving representatives from EU Member States.

EU “regulations” are directly applicable and binding in their entirety for EU Member States. EU “directives” are binding as to the result to be achieved, but leave to national authorities the choice of forms and methods regarding its application. Hence, directives have to be transposed into national law by EU Member States in order to be implemented.

Implementing rules in the EASA competence domains are developed through the Agency’s rulemaking process and, eventually, formally adopted by the European Commission through the comitology procedure. In addition, the EU regulatory framework contains non-binding “soft law” in the form of Certification Specifications (CS), Acceptable Means of Compliance (AMC) and Guidance Materials (GM) – all issued by EASA.

Norway as part of the EU aviation framework

Norway is an integral part of the EU aviation market in the context of the European Economic Area – EEA – Agreement³. A substantial part of Norway's civil aviation legislation actually derives from the EU aviation acquis as – pursuant to the EEA Agreement – Norway has accepted to transpose the EU aviation legislation into its national legal framework.

As regards aviation oversight, Norway is part of the EASA system and thus Norway's aviation oversight function is shared with EASA. EASA is responsible for the oversight of activities where executive powers have been transferred to the EU. The Agency was founded in 2003 as the successor to the Joint Aviation Authorities (JAA), which had established the first harmonised European safety standards.

The table below outlines the current division of tasks between EASA and the national aviation authorities – hence the division of tasks between EASA and Luftfahrtstilsynet:

Domain	Scope of oversight EASA	National Aviation Authorities
Air operations	Third country air operators	Air operators
Airworthiness	Design of aircraft (incl. products, parts, appliances) Organisations involved in the design of aircraft Organisations involved in the production of aircraft – when agreed by the Member States concerned Organisations based outside the EU that are involved in the design, production, maintenance and maintenance management of aircraft; and the training of certifying staff	Airworthiness and noise certification of individual aircraft Organisations involved in the production of aircraft Organisations involved in the maintenance and maintenance management of aircraft Certifying staff

³ Ratified by Norway on 19 November 1992.

Domain	Scope of oversight EASA	National Aviation Authorities
Aircrew Licensing	Organisations based outside the EU that are involved in the training of pilots Flight Simulation Training Devices (FSTD) located outside the EU or used by organisations certified by EASA.	Flight crew Flight Crew Training Organisations Flight Simulation Training devices used by the approved training organisations Aeromedical centres
ATM and aerodromes	Air Navigation Service Providers providing services of a pan-European nature Air Navigation Service Providers located outside of the EU, but providing a service inside the EU Foreign Air Traffic Controller Training organisations.	Air Navigation Service Providers and Aerodrome Operators Air traffic controllers and other ATM or aerodrome personnel Air Traffic Controller Training Organisations
Aviation Security	Currently not in the EASA remit	Aviation Security oversight of all relevant national actors (airports, air carriers, and other operators applying aviation security standards)

1.3. *Aviation safety oversight functions*

The obligation for each State to establish and maintain a safety oversight function stems from the ICAO Convention as well from the EU aviation acquis. The safety oversight functions must be impartial and independent from the supervised entities. Under EU law, States must ensure that their national aviation authorities have the necessary capabilities and resources to carry out their tasks.

The conformity of the State's safety oversight functions with applicable (international and European) regulatory requirements is itself subject to supervision by both ICAO and EASA:

- ➔ ICAO has established the Universal Safety Oversight Audit Programme – USOAP – in order to assess whether the Contracting States are properly performing their safety oversight, but the cost-effectiveness dimension is not assessed;
- ➔ EASA monitors the work of national aviation authorities and regularly conducts “standardisation inspections, with the aim of ensuring the proper and coherent application

of the EU aviation safety provisions. The audit findings are followed up with the authorities concerned. However, the standardisation inspections do not examine the cost-effectiveness of CAA activities.

The oversight functions are organised differently in different states. In some states, the civil aviation authority has merged with authorities for other modes of transport. Moreover, the distribution of tasks and responsibilities between the appropriate ministry and the civil aviation authority may differ.

It has therefore been necessary, for the purpose of the benchmarking study, to identify those differences and isolate the costs and the effectiveness of the “pure” civil aviation safety oversight functions. Descriptions of the specifics of the benchmarked authorities are in chapter 4.

1.4. *Key challenges affecting aviation authorities*

In this section, we are aiming to identify and briefly outline, as a backdrop to our study, some key challenges affecting and driving the performance of aviation authorities in the European context. As public sector organisations, the authorities face increasing pressure to improve the efficiency and quality of their services. At the same time, a wide range of regulatory, societal and economic challenges, which are either partly or completely beyond the control of these authorities, have a substantial impact on their performance.

The organisation and resources of aviation authorities are undoubtedly driven by the applicable regulatory framework and its evolution. By and large, the authorities are faced with a complexity of regulatory issues, which derive from the intrinsically international nature of the aviation sector as well as from the continuous evolution of the EU aviation acquis. Regulatory developments at EU level, increasingly resulting from the EASA rulemaking process, have considerable resource implications for the authorities and often establish additional expertise requirements for their staff and inspectors.

Technological progress in the aviation industry also has a direct impact on CAA activities, and can increase the complexity of oversight. CAAs have to oversee the safety of new technological solutions when they are implemented by aviation operators, e.g. features such as satellite-based navigation (aids), satellite based landings, remote tower technology, new operational concepts (time based operations), to name just a few. Regulatory approval of new technologies requires regulatory competence, which is often hard to come by as the competence in these leading technologies often resides with the industry.

Accordingly, it is essential to highlight the nature of CAA activities, which clearly require a high level of technical expertise, often in very specific fields. In order to fulfil their regulatory duties and deliver their tasks predictably and reliably, authorities have to continuously maintain adequate capabilities and expertise in connection with the supervision of the aviation sector. This is the case regardless of the size and characteristics of the national aviation industry or of the general economic context.

In the aviation industry, there is an increasing trend towards new business models and forms of organisational set-up, the aim being to minimise costs by selecting providers and services from

across the globe (for example: crew from Thailand, aircraft registered in Ireland, aircraft maintenance in the US, operation out of Norway). These organisational models are an increasing challenge to the regulatory authorities. These new production-chain models make it more difficult to keep an overall view on an organisation, and can – ultimately – affect safety. It can be expected that the legal advisory body within the national regulators will need to be increased in the future as these organisational models do not only pose a challenge in terms of maintaining overall oversight, but also unlock many unanswered legal questions.

As a result, challenges may arise in relation to the budgeting and efficient use of CAA resources, as it may be difficult to precisely predict in advance the demand for services, for example regarding applications for new certificates or licenses. In countries where the size of the aviation industry is limited, the annual workload may notably vary on an annual basis, and may particularly depend on the developments concerning a few major national stakeholders.

Finally, aviation authorities are expected, in connection with the modernisation of public administration, to make use of innovative processes and new technologies. Modernisation efforts aim to respond to changing customer needs, but also seek to enhance the efficiency and quality of services. Efficiency gains have also been pursued through the reorganisation of institutional structures, for example by establishing integrated national transport authorities incorporating the functions of the civil aviation authorities.

1.5. *Selection of benchmarked authorities*

The identification of the civil aviation authorities to be included as part of the benchmarking study was one of the first key milestones of the project. In cooperation with the Ministry of Transport and communication, the following general criteria were set out and applied with a view to identifying a suitable comparator group of CAAs/countries:

- *legal framework*: the benchmarked CAAs should operate under the same overarching legal framework and requirements as Luftfartstilsynet, i.e. the EU aviation acquis;
- *geographic and cultural proximity*: some of the examined countries should have geographic and/or cultural proximity with Norway and compare within the Scandinavian context, while the benchmark should also include some organisations outside Northern Europe. This combination of selected countries is seen to enable an understanding of 'industry best practice';
- *economic environment*: the CAAs have to be from countries having a comparable level of economic development (GDP, cost of living etc.);
- *technical and operational framework*: there should be similarities regarding the size and characteristics of the national aviation industries and/or similar operational conditions (e.g. complexity of airspace) – moreover, the countries/CAAs concerned should have reached a sound level of maturity concerning the implementation of the aviation legislation;

- *variety of organisational models*: the study should examine and compare the different institutional models for organising CAA activities – the comparator group should therefore cover a variety of organisational options.

Based on the general criteria above, the following organisations were selected for the benchmarking study together with Luftfartstilsynet:

- **Trafikstyrelsen** (Denmark): Nordic country & neighbour, aviation industry of comparable size, CAA function as department of Transport Authority
- **Trafi** (Finland): Nordic country & neighbour, FAB partner in NEFAB, similar size of industry, aviation regulation & oversight conducted as part of Transport Authority within thematic departments covering all transport modes
- **Transportstyrelsen** (Sweden): Nordic country & neighbour, CAA as part of integrated Transport Authority
- **FOCA** (Switzerland): legal arrangements with EU similar as for Norway, similar operational conditions (terrain), dedicated authority for civil aviation
- **CAA UK** (United Kingdom): dedicated authority for civil aviation, seen as modern public service organisation, comparable operational challenge (North Sea Offshore). In addition, a comparison with the CAA UK allows for a comparison with view on realising scale effects (due industry size/volumes).

Samferdselsdepartementet and Luftfartstilsynet validated the selected comparator group. Through correspondence with Samferdselsdepartementet, all the selected organisations expressed their willingness to participate in the study and to share the necessary data.

2. Theoretical background

2.1. *Assessing the efficiency & value for money of public sector organisations*

Particularly in Western societies, governments are continuously striving to improve public sector performance with a view to making a better use of taxpayers' money and containing expenditure growth. In times of budgetary pressures, citizens are demanding governments to be more transparent and effective about spending and the associated return for taxpayers.

This focus on public sector performance, often also referred to as Value for Money (VfM), is based on the view that public sector organisations can – analogue to private sector companies – undergo continuous performance improvements, whereby the same output (qualitative and quantitative) is achieved with fewer resources, or a better return is provided to customers while maintaining the same level of resources (inputs). In absence of market incentives to increase process efficiency, it is often theorised that public sector organisations lack the pressure to constantly improve.

Figure 1 outlines the theoretical framework and components relating to the performance of a public service organisation:

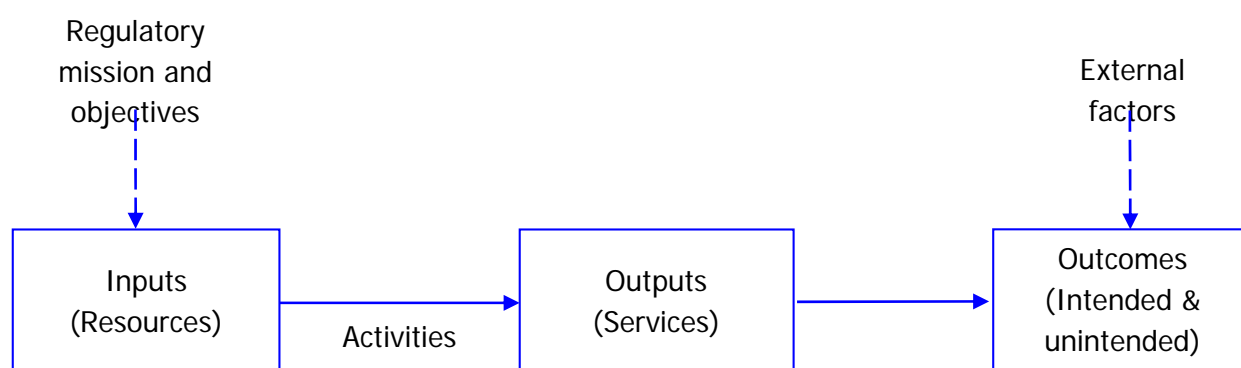


Figure 1 – Theoretical framework and components of public service performance

It is necessary to briefly define the concepts above from the perspective of a civil aviation authority (CAA):

- ➔ **Inputs** refers to the resources (budget, staff, premises, equipment, services) used by the CAA to perform its activities and deliver services. Inputs are granted by the Government based on the regulatory mandate and allocated to the CAA depending on objectives of the agency.
- ➔ **Outputs** are the (public) services delivered to the Government and to customers by the CAA as a result of its oversight and rulemaking activities. In the context of this report, the focus lies on an assessment of how this output can be provided most efficiently.

- **Outcomes** reflect the ultimate impact of the CAA's activities. The intended primary outcome for a CAA is the safety and quality of the national aviation sector. However, these outcomes are typically influenced by a wide array of external factors beyond the control of the CAA, which makes it impossible to precisely determine the CAA's direct contribution to these outcomes. This is why the present study focuses on examining the inputs and outputs of CAA activities, while only indirectly acknowledging the actual outcomes.

Assessing the value for money of any public organisation is about understanding the relationship between the outputs it produces and the inputs it uses. In the spirit of this relationship, an efficient organisation is one that produces the maximum possible outputs given its inputs, or one that produces a certain level of output with the minimum amount of resources/inputs.

However, the performance of an organisation is also determined by the quality of its services and its ability to deliver the expected outputs in a timely and reliable manner – in the context of the present report, this refers to the effectiveness of the organisation.

2.2. Economy, Efficiency, Effectiveness

In general, the performance of a public sector organisation is gauged through the three dimensions of “economy”; “efficiency” and “effectiveness” (also called the “three Es”).

It is relevant for the understanding of this report that the distinction between the “three Es” is not only semantic – the “three Es” refer to three different notions, each expressing a different relationship between inputs and outputs as illustrated in Figure 1.

The concept of “economy” refers to the cost, quality and quantity of the human and material resources (inputs) used by an organisation. From the perspective of a CAA, this entails looking at whether the CAA is making a good and careful use of its resources.

Measuring an organisation's “efficiency” is about the relationship between the outputs it produces and the inputs it uses. In the case of a public sector agency such as a CAA, the key question in regard to “efficiency” is: Can the agency potentially deliver the same level of service (quantitative and qualitative output) for less input (resources)?

Hence, an efficient organisation is one that produces the maximum possible outputs given its inputs, or one that produces a certain desired or required level of output with the minimum amount of inputs. The process of trying to measure an organisation's efficiency is composed of different steps that include the definition, measurement and – ultimately – analysis of inputs and outputs.

Efficiency measurement is relatively straightforward in the case of organisations producing one type of output with one type of input, where prices for outputs can be compared, based on the assumption that prices will reflect market or buyers' valuations of the outputs. However, most organisations – public and private – produce numerous different outputs while using a wide array of differing inputs.

Particularly in the case of public sector organisations, this input/output equation is complicated as the prices for the delivered outputs are not set under market conditions and are therefore not obeying market rules (determining prices for services, rooting out low quality performers, etc.).

The aforementioned observation points to the importance of also examining the dimension of “effectiveness” when assessing the performance of a public institution. Effectiveness is in principle about assessing whether the service level provided is reflecting the volume of input. For a public sector agency such as a CAA, the question raised here is, if the agency can potentially deliver a better (higher quality) service with the same resources.

Thus, effectiveness closely relates to the service quality (quality of outputs) from a user perspective, e.g. regarding the timeliness, responsiveness and reliability of the provided services. The implementation of leaner, innovative processes and tools can improve effectiveness, not only by reducing the administrative burden for customers but also by allowing public agencies to focus on their most critical technical duties.

Effectiveness can also be considered from the point of view of outcomes, i.e. by evaluating to which extent the organisation has reached its objectives in terms of outcome (comparing the intended impacts and actual impacts of activities). However and as mentioned, the present study will not examine the effectiveness of outcomes mainly due to the inability of objectively measuring the contribution of a CAA to an observed outcome.

The ICAO Universal Safety Oversight Audit Program (USOAP) was launched in January 1999 with the objective of promoting global aviation safety through the auditing of ICAO Member States. The goals of these audits were to determine, for each Contracting State, the level of implementation of relevant ICAO Standards and Recommended Practices (SARPs), associated procedures, guidance material and safety-related practices the status of States’ establishment of, and to assess safety oversight measures and allocated resources.

In 2011, the USOAP evolved from a program performing periodic audits to a new approach based on the concept of ‘continuous monitoring’. While the benefit of the USOAP results is that the level of compliance with ICAO regulations is visible (and comparable), one must be aware that some of the audits have been made in the past and do not necessarily reflect the status anymore. For the purpose of this report, it is assumed that the outcome (safety of the civil aviation system) is affected (amongst others) by the level of compliance with relevant safety regulation, hence Figure 2 shows the results of the ICAO USOAP audits of the selected CAAs.

2.3. Benchmarking in the public sector

“Benchmarking” as a performance measurement tool is based on the principle of comparing one organisation against a comparator group of entities. The comparator group is composed of organisations operating in the same field (and with similar size and similar regulative environment

etc.), which also allows the identification of best practices in delivering public services in a cost-effective manner⁴.

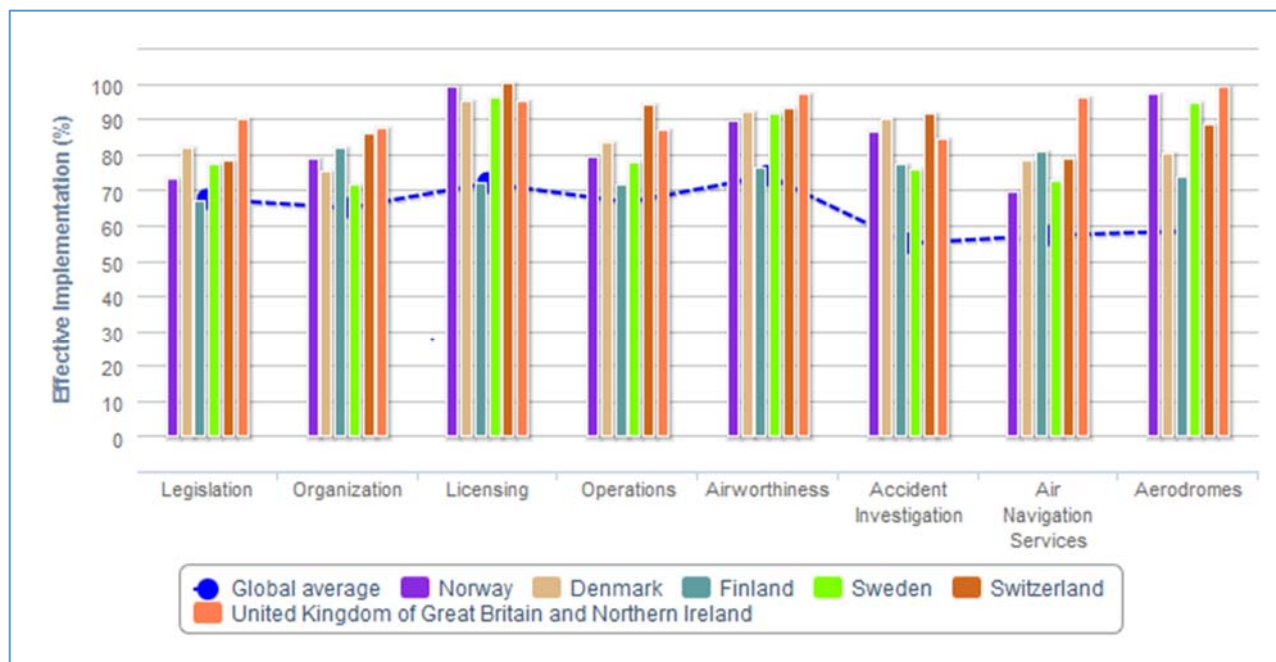


Figure 2 – Results of the ICAO USOAP audits of the selected CAAs

A benchmarking analysis is typically used to:

- objectively assess performance;
- expose areas where improvement is needed;
- identify other organisations with processes resulting in superior performance.

There are different benchmarking techniques available, depending on the selected industry and the defined goals of a comparative analysis. In the context of this study, the relevant techniques^{5 6} are:

- **Results benchmarking**
 - comparing the performance of a number of organisations providing a similar service. In the public sector, this technique can serve to allow the owner/public to judge whether their provider makes good use of its resources, compared to other similar providers. In the absence of the competitive pressures, which operate in the private sector, this has

⁴ Dorsch, Yasin, 1998: A framework for benchmarking in the public sector: Literature review and directions for future research

⁵ Cowper, Samuels, 1996: Performance Benchmarking in the Public Sector: The United Kingdom Experience

⁶ Tillema, 2009: Public Sector Benchmarking and Performance Improvement: What Is the Link and Can It Be Improved?

been seen to provide a significant incentive to improve performance. In the context of the present study, this has been used to obtain quantitative data.

→ **Process benchmarking**

– is about undertaking a detailed examination within a group of organisations of the processes, which produce a particular output, with a view to understanding the reasons for variations in performance and incorporating best practice. This benchmarking technique is typically used to obtain qualitative data.

It is necessary to note that a cross-country benchmarking analysis – in particular quantitative analysis – will always be particularly sensitive to the data sets being used. The different institutional and organisational arrangements in different countries will inevitably be reflected in the quantitative data collected and will therefore influence the accuracy of the benchmarking analysis.

The present study confirms this observation. To mitigate such a misinterpretation of data as much as possible, the selected methodology, which is described in more detail in the following chapter, applied a standardised approach, built upon the EU regulatory structure for aviation, and placed considerable emphasis on the qualitative analysis.

3. Project process and methodology

3.1. Methodology

In absence of a functioning customer market for CAA services (as CAAs provide monopolistic public services), it is challenging to assess the price/quality ratio for the output of any CAA. A conducted stakeholder consultation revealed relevant perceptions from the CAA beneficiaries but must be seen in context of the often long lasting relationship between CAA and customer and the lack of possibilities to compare the outputs.

Based on the above and highlighted by existing studies that were concerned with benchmarking of public sector organisations, it became evident that in order to conduct a fair and value-adding study, three main elements must be acknowledged:

Contextual information

National governments mandate, according the existing legal framework and the specific national transport policies and goals, the national CAAs. In addition, the specific national air transport landscape can vary significantly between countries in terms of 'mix of actors' and sizes of specific industry segments. The organisational structure of a national CAA must respect these national specifics, and a comparative analysis must take contextual elements such as for example the national policy regarding charging of public services, the composition of the national air transport industry or the general economic situation of a national economy (high-price country vs. low-price country) into consideration.

Quantitative data

A key element in any comparative study is quantitative data. Quantitative data is in a numeric form and allows for making descriptive statements about the data. These include descriptive statistics like the mean, median and standard deviation but let one also derive important facts from research data, including for example preference trends, differences between groups, and demographics. The strength of quantitative data is their very descriptive nature, which allows for comparisons, but the biggest challenge with these type of data is their correct interpretation.

Qualitative data

Qualitative data describe the qualities or characteristics of processes and outputs. Qualitative data includes information about staff behaviours, needs, desires, routines, use cases, and a variety of other information that is essential in understanding a certain type of product or process.

Each of these elements has – in itself – only a limited explanatory power. However, combined they allow for a more holistic understanding of the complexity in connection with measuring CAA service efficiency.

Based on this understanding, the project execution was designed in a way that focused on the collection of contextual, quantitative and qualitative data as a fundament for the analysis.

The next section describes the four key methodological elements that were used to conduct the present study.

3.2. *Project phases and steps*

At the outset of the study, Samferdselsdepartementet and Integra agreed to organise the work in four overlapping phases as shown in Figure 3 – Key steps and milestones:

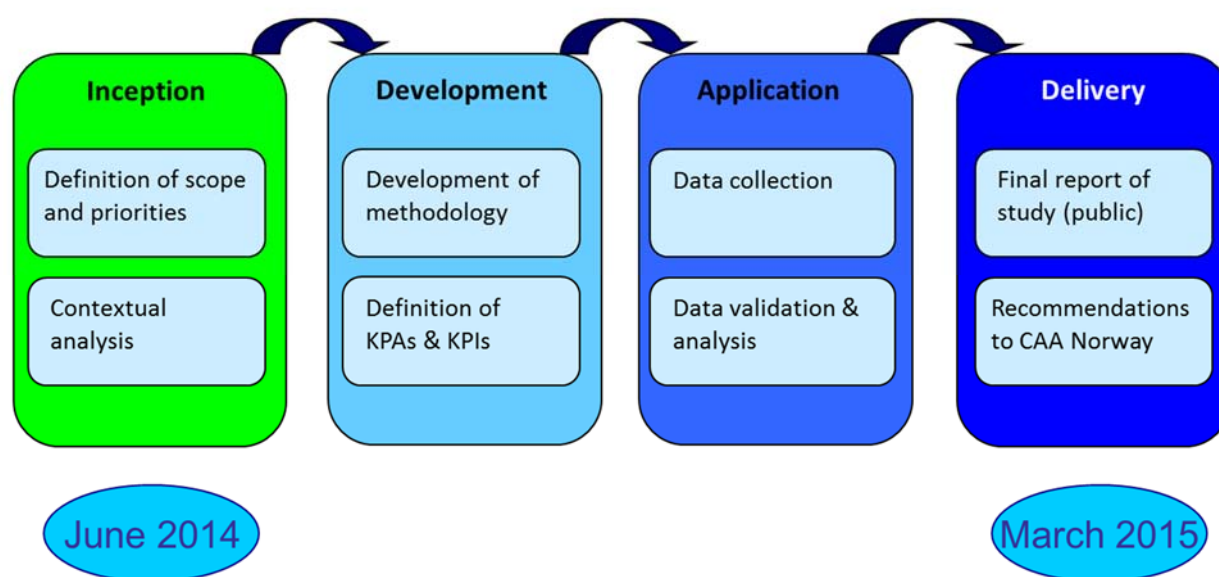


Figure 3 – Key steps and milestones

Inception

In reference to the Contextual Information mentioned above, a complete understanding of organisation, tasks and working methods was considered core to the quality of the benchmark. Therefore, the initial analysis of Luftfartstilsynet included also those tasks and responsibilities not related to safety oversight as well as Luftfartstilsynet's general role within the Norwegian state administration – or to say it differently: it was essential to obtain a full understanding of the legislative and operational framework, in which Luftfartstilsynet is operating.

Also in this project phase and in order to achieve viewpoints from two of the main 'costumers' of Luftfartstilsynet, interviews with NHO Luftfart and Avinor Flysikring were conducted. Inputs from these stakeholder consultations were used to detect areas and processes where the customers believe that improvements in efficiency and quality can mostly be achieved.

Development

Based on the initial analysis, Integra developed – in close coordination with Samferdselsdepartementet – the key performance areas and indicators to be used. In the same way, the key processes to be analysed for benchmarking purposes were defined. Section 3.3 explains in more details the applied view on key performance areas and key performance indicators and lays out the criteria that have been applied in the selection of the quantitative and qualitative data sets as a foundation for this report.

Application

Based on the agreed key performance areas/indicators and key processes, the same data was requested from all the participating authorities, using the questionnaire shown in Appendix II. Subsequently, interviews were conducted with key persons in the benchmarked authorities in order to validate and ensure full understanding of the data and to obtain a first-hand walkthrough through the qualitative processes.

Figure 4 below shows list of meetings with authorities and entities for the purposes of gathering background information, validating the quantitative data collected, and conducting interviews to improve the understanding of individual processes.

Date	Entity	Meeting subject
19 May 2014	Samferdselsdepartementet Oslo, Norway	Project Kick-Off
18 August 2014	NHO Luftfart, Oslo, Norway	Gathering information on 'costumer' community expectations
19 August 2014	Avinor Flysikring, Oslo, Norway	Gathering information on 'costumer' community expectations
8-9 September	Luftfartstilsynet, Bodø, Norway	Coordinating questionnaire
15 September 2014	Samferdselsdepartementet Oslo, Norway	Coordinating questionnaire
12 October 2014	Trafi, Helsinki, Finland	Data verification – interviews
4 November 2014	Transportstyrelsen, Norrköping, Sweden	Data verification – interviews
20 November 2014	FOCA, Bern, Switzerland	Data verification – interviews

26 November 2014	Trafikstyrelsen, Copenhagen, Denmark	Data verification – interviews
9 December 2014	Luftfartstilsynet, Bodø, Norway	Coordination meeting
16 December 2014	Ecorys, Rotterdam, The Netherlands	Internal workshop
7-8 January 2015	Luftfartstilsynet, Bodø, Norway	Data verification – interviews
16 February 2015	CAA UK, Gatwick, United Kingdom	Data verification – interviews
5 May 2015	Luftfartstilsynet, Bodø, Norway	Consultation on Final Draft Report

Figure 4 – List of consultative activities

Applied currency exchange rates

When measuring cost-efficiency it is imperative that data are comparable, and as all benchmarked authorities use different currencies, it was necessary to develop a conversion table in order to ensure fairness of the comparison. In 2014, Europe has seen a fluctuation in exchange rates, which is almost unprecedented over the last decades and an application of exchange rates at the end of the year would have blurred the picture. To allow for a fair comparison of the exchange rates, it was decided to use an aggregated average exchange rate that included the timespan 2011-13. As a result, the following exchange rates have been used throughout the report in order to present all economic data in EUR:

NOK 100.00	=	EUR 13.00
DKK 100.00	=	EUR 13.40
SEK 100.00	=	EUR 11.37
CHF 100.00	=	EUR 81.81
GBP 100.00	=	EUR 118.84

Delivery

The final phase included an in depth analysis of the collected data and preparation and finalisation of the report.

3.3. Key performance indicators for quantitative analysis

Amongst European civil aviation authorities, Luftfartstilsynet is not unique in carrying out tasks and responsibilities that are not safety oversight related. To different degrees, other civil aviation authorities perform policy advice and rule-making functions – nationally as well as internationally – security oversight, facilitation procedures or provide consulting services as well as customer protection programs, and in a number of European states, the civil aviation authorities have been

merged with other similar authorities in an attempt to reduce overhead costs to support functions and administration.

To establish some base understanding of the sizes of the different organisations, of the volume of tasks and processes, and to be able to demonstrate comparability of the aviation markets in the selected countries, a set of quantitative data was needed.

The required quantitative data mainly included data concerning the number of staff allocated to certain domains, the budgetary allocations to domains and some raw high level data describing the costs associated with production of a certain output as well as figures describing the volume of output. As part of the process of validating the data received through our study questionnaire, we also collected reports submitted by the benchmarked authorities to EASA through the existing electronic reporting system (the EASA *Standardisation Information System* – SIS).

Usage of the data was twofold. On the one hand, it was used to establish a 'picture' of the benchmarked organisations and to be able to compare certain core processes on a high level such as for example number of CAA employees / million inhabitants.

On the other hand, the data was also used to validate findings from the qualitative research and to be able to draw conclusions on formulated hypotheses.

3.4. Key processes selected for qualitative analysis

As mentioned, Luftfartstilsynet performs tasks and has responsibilities that are not purely related to aviation safety oversight, and these tasks and responsibilities were not in the focus of the benchmarking study. Therefore, the selected key processes were defined within the scope of the safety critical elements, which are the basis for the ICAO Universal Safety Oversight Audit Programme⁷ (USOAP).

Other criteria in the definition of key processes were that they should be relevant to the organisation in terms of human and financial resources, should be enablers for better efficiency and should be in line with best practices as formulated by ICAO and EASA⁸.

Based on the above criteria, the key processes selected for this benchmarking study were:

→ Application of Risk Based Oversight as a methodology

Risk Based Oversight (RBO) is sometimes also referred to as Performance Based Oversight and is defined⁹ as: "a way of performing oversight, where planning is driven by the risk profile and execution, besides ensuring compliance, focuses on the management of operational risks". It describes the new paradigm within safety oversight where there is a transformation from pure 'compliance based' oversight to an oversight philosophy

⁷ The ICAO safety oversight audit of Norway in 2006 resulted in no significant safety concerns.

⁸ European Aviation Safety Agency.

⁹ EASA, 2012

whereby the oversight resources are focused on elements and actors with a higher risk profile. It is a wide held belief that application of RBO principles within any supervisory organisation can be an enabler for a more efficient use of resources.

→ **Use of information technology in the safety oversight processes**

The use of Information Technology (IT) has led to substantial efficiency increases in many industries and businesses. A particular benefit of IT can often be found when applied to processes that are repetitive and require fast access to different data. As such, regulatory oversight appears to be predestined to be an area of application for advanced IT solutions. Another area of interest in this context concerns the use of IT as a means of optimised communication with stakeholders – this includes the usage of shared databases, the application of web based interaction solutions or standardised reporting and application forms that minimise manual transposition into CAA databases.

→ **Collection and dissemination of safety data**

The collection and analysis of safety data is one of the core tasks in the oversight of the aviation sector, as this process has a direct impact on the outcome (e.g.: the safety of the national aviation system). By examining these processes across some of the most advanced national CAAs, the intention was to identify the most efficient way of conducting this task without affecting the quality of the outputs.

→ **Civil emergency response planning and preparedness**

This process was selected, based on the assumption that the benchmarked authorities had been given different mandates with regard to tasks and responsibilities, for example in the areas of threats against national security, natural disasters such as fires and flooding, major search and rescue operations, precautions against infectious diseases etc. The different mandates might influence the allocation and use of resources.

→ **Procedures for ensuring staff competency**

One main findings of the stakeholder survey in the beginning of the project was that the stakeholders appeared to be less price-sensitive in regard to fees and charges but strongly indicated the importance of highly competent staff in the authority. They found it essential that dialogues with the authority could take place at the adequate technical level to ensure safety as well as economy in the interrelations between them. For the corporate customers (air navigation service providers, airlines, airports), missing competence by the CAA can lead to postponement of approval of new concepts or delays in the implementation of new technologies. Costs associated with this kind of implementation delays is considered to be of higher importance than the costs connected to the 'standard' products such as licenses or fees.

4. Luftfartstilsynet

Aviation in Norway is under the responsibility of the Ministry of Transport and Communications (MoTC – Samferdselsdepartementet). Mandated by Samferdselsdepartementet, the Norwegian Civil Aviation Authority (Luftfartstilsynet) is responsible for all regulatory activities and is the appointed National Supervisory Authority (NSA) for Norway. The main objects of Luftfartstilsynet's safety oversight are:

- ➔ the Air Navigation Service Provider Avinor Flysikring A/S, which is appointed by Samferdselsdepartementet to provide air navigation services within the Norwegian area of responsibility;
- ➔ the major commercial carriers holding Norwegian Air Operators Certificate: SAS, Norwegian Air Shuttle and Widerøe; and
- ➔ a large offshore helicopter segment.

Luftfartstilsynet is the regulatory body for safety in Norway, and its responsibilities include rulemaking, safety oversight, and safety performance monitoring and air traffic management (ATM) safety occurrence analysis.

Luftfartstilsynet is responsible for introducing and adapting national and international regulations. In addition, Luftfartstilsynet develops specific national regulations for Norwegian aviation. Norway adapts and implements EU/EASA regulation in most areas in order to contribute to harmonised sets of laws, rules and regulations across Europe.

Luftfartstilsynet oversees the actors in the Norwegian aviation and assures compliance with applicable laws, rules and regulations. To ensure that, the oversight includes airlines, aircraft maintenance and repair, training institutions, holders of certificates and licenses, airports and heliports.

Luftfartstilsynet also issues the certificates and licenses to individuals and to operators and service providers.

Together with Samferdselsdepartementet, Luftfartstilsynet is participating in activities of international organisations to assert Norwegian interests. The two main organisations in this context are the European Aviation Safety Agency – EASA, and the UN International Civil Aviation Organization – ICAO.

The Norwegian Context

Air transport is the main mode of transportation in Norway for longer journeys within the country – as Norway is a vast country with long distances between the cities – and abroad. Norway has a

population of 5.05 million, and the aviation sector contributes to the national GDP with 2% and adds 61 000 jobs¹⁰.

Around 30 million passengers and 66 000 tons of freight travel to, from and within Norway annually. The aviation sector that has seen growth over the last decade, while the rest of Europe aviation segments at the same time were at best stagnating or even declining. More than 87 000 scheduled international flights depart Norway annually, destined for 130 airports in 35 countries. Domestically, more than 231 000 flights make over 19 million seats available to passengers annually, destined to 48 airports.

In several regions in Norway, distances are long and road standards poor, and transportation by train is only available in some parts of the country. It has therefore been decided at the political level to base the transportation infrastructure primarily on aviation and to operate a large number of smaller airports around the country and at Svalbard. This has an effect on the requirement for oversight resources in the areas of air navigation services and aerodromes.

As a result, Norway has registered 192 aerodromes/airports with ICAO¹¹, of which 50 are subject to EASA Regulation 139/2014. The numbers of air navigation services units in Norway are:

- ➔ 33 aerodrome flight information (AFIS) units
- ➔ 2 heliport flight information services (HFIS) units
- ➔ 20 air traffic control (ATC) units
- ➔ 3 area control centre (ACC) sectors on different locations

Functions of Luftfartstilsynet

The main functions of Luftfartstilsynet can be grouped as follows:

- ➔ **Access Control**
Luftfartstilsynet conducts various forms of access control before a supervised entity is approved and approval documentation is issued. The most common forms of access control are performed through documented investigations, testing and inspections. Access control is undertaken in relation to organisations, aircraft, equipment and persons who are either employed or seeking employment within an organisation in the civil aviation arena. This access control includes initial applications for operators entering the civil aviation system or renewal of existing licenses.
- ➔ **Commercial Supervision**
This includes mainly the planned inspections of various supervision objects. Basis for the conduction of these inspections is the national and international requirements for flight

¹⁰ Oxford Economics, 2011

¹¹ ICAO Doc 7910/154 – Location Indicators

safety. Luftfartstilsynet defines, on the basis of these requirements, a policy for the frequency of inspections the different groups of supervision objects.

→ **Rulemaking**

As a Europe wide harmonised regulatory landscape is the declared goal of the European Commission (EC), the majority of rulemaking as of today is performed on the European level through EASA. Luftfartstilsynet actively participates in these rulemaking processes. The mandatory regulations determine which legislation must be implemented to achieve the highest possible level of safety. In Norway, the national regulations are continuously updated as European and international rules and regulations are transposed into the national legislation.

→ **Information**

An important part of the aviation safety activities is information to users and stakeholders. Safety consciousness develops continuously, and this must be communicated in an effective manner. Examples of safety information include announcements, statistics of accidents and incidents, conferences, press releases and other essential information. Luftfartstilsynet's website is the main channel of information, and staff frequently participates in conferences, events and meetings to obtain and provide information about industry trends and to exchange safety knowledge.

Organisation of Luftfartstilsynet

CAA is organised into eight departments, two of which are staff units to the Director General as shown in Figure 5.

In total (2013), Luftfartstilsynet has 183.5 FTEs and has an operational budget of EUR 25 129 000, of which 71.3% is self-financed through income from fees and charges. While the costs of oversight activities are covered through the revenue, the rulemaking part as well as projects and administration of the organisation that are funded through the State budget. Figure 6 and Figure 7 show the distribution of resources in terms of budget and staff allocation between the aviation domains.

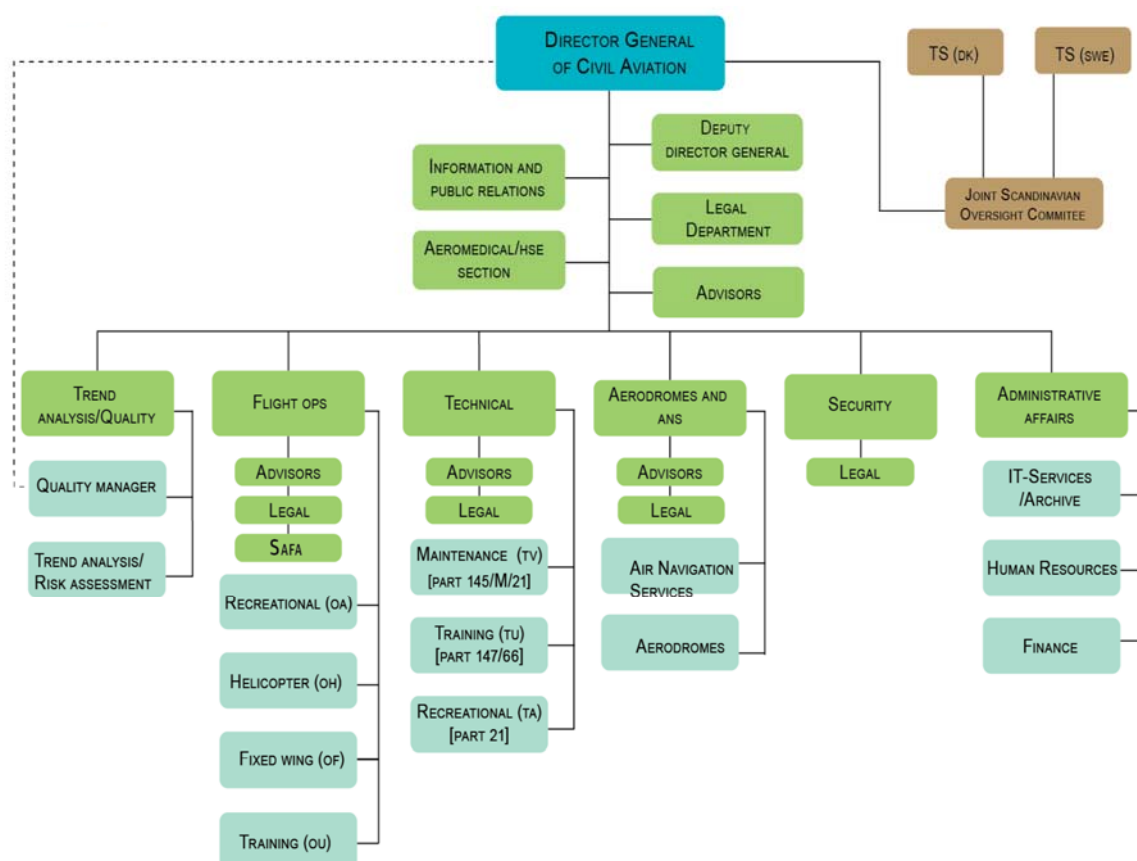


Figure 5 – Organisation of Luftfartstilsynet

The distribution of resources shown in Figure 6 and Figure 7 serves only as an indication about the sizes of the different domains within Luftfartstilsynet. It is important to note that variations in budget and staff allocation can occur as resources allocation can be measured in different ways.

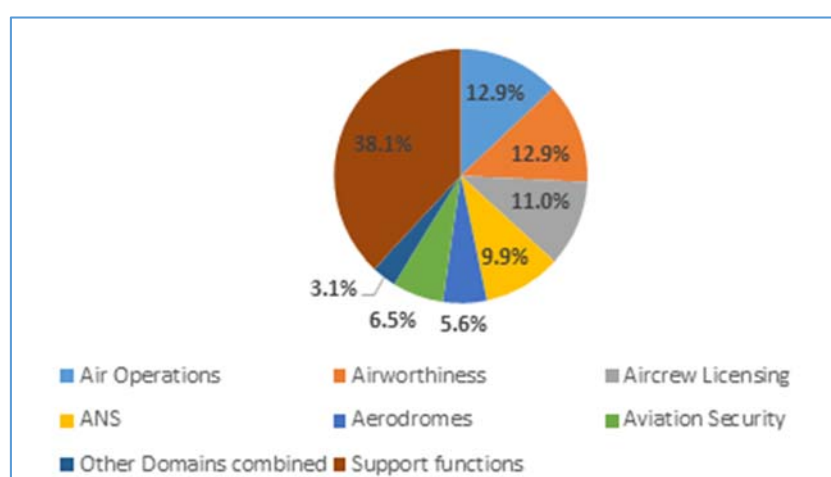


Figure 6 – Distribution of financial resources, Luftfartstilsynet

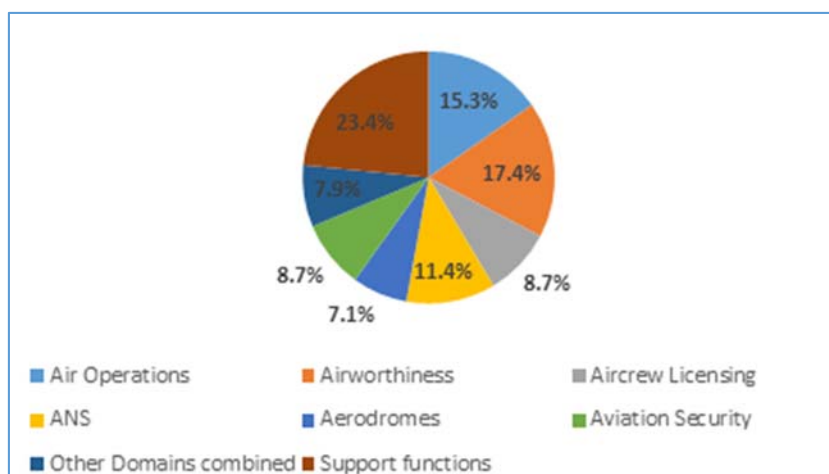


Figure 7 – Distribution of staff resources, Luftfartstilsynet

5. The benchmarked authorities

5.1. Trafikstyrelsen – Denmark

Trafikstyrelsen is an integrated transport authority, formed in 2010 by the merger of the authorities for civil aviation, railways, road transport, ports and public transport in Denmark. Trafikstyrelsen is also the civil aviation authority of the Faroe Islands and Greenland. It is expected that further mergers will take place in the years to come, possibly integrating the maritime authority as well.

The Danish Context

Denmark has a population of approximately 5.58 million, and the national aviation sector contributes to the GDP with approximately EUR 2.68 billion, equal to 1.2% of the National GDP¹². Around 45 000 jobs are created in this sector, and more than 22 million passengers and 160 000 tonnes of freight travelled to, from and within Denmark. Around 112 000 scheduled international flights depart Denmark annually, destined for over 148 airports in 50 countries. Domestically, more than 36 000 flights make over 2.8 million seats available to passengers annually, destined to nine airports.

Naviar, the national Air Navigation Service Provider (ANSP), mainly provides air traffic management (ATM) within Danish area of responsibility. In the period 2005-11, over 600 000 IFR flights have been served annually by Naviar.

In 2009, a Danish-Swedish functional airspace block (FAB) was established in order to achieve seamless crossings of the national borders. The same year, the Danish-Swedish company Nordic Unified Air Traffic Control (NUAC) was formed and took over the provision of air traffic management in parts of both Danish and Swedish airspace in 2012.

The regulation of air transport is compliant with all international requirements. This applies to International Civil Aviation Organization (ICAO), whose provisions have been implemented through national regulation, both in the Danish Air Navigation Act and related Regulations for Civil Aviation. EU/EASA regulation is playing an increasingly important role and has precedence over national aviation legislation.

In areas, where no EU/EASA regulation exists or applies, as well as in Greenland and the Faroe Islands, the national aviation legislation applies.

The aviation industry covers the costs of the safety oversight provided by Trafikstyrelsen, based on the principle of full user funding. The total user fees are determined by Trafikstyrelsen so as to cover the total costs of the civil aviation safety oversight, while costs associated with rule-making activities are covered from the State budget. There is a cross-subsidy from the large air operators

¹² Oxford Economics, 2011

to the small and medium-sized operators and to training organisations etc. In this way, the so-called undergrowth in Danish aviation is supported. Effective 1 January 2012, aviation fees have been reduced by 10%¹³.

Tasks of Trafikstyrelsen

Trafikstyrelsen's main task within aviation is to ensure that the civil aviation system is safe. This is done through implementing international regulation and standards and supervising/controlling the entry and exit of actors into the civil aviation system.

Practically, these tasks are conducted by staff from the "Centre for Civil Aviation", which is then further divided in thematic divisions (Airworthiness, Airports etc.) Trafikstyrelsen describes the tasks as:

"The Centre is responsible for safety and security regulation with regard to the civil aviation infrastructure, such as air navigation services, aerodromes and associated facilities. The centre is also responsible for regulation and inspections with regard to safety and security of all Danish commercial air transport operators, maintenance organisations, aircraft, design and production organisations and aerodromes. Furthermore, the centre handles tasks related to personal certification of aviation as well as tasks related to training of drivers for road transport. In this context, the Centre regulates safety, authorization and supervision in relation to aviation schools and training organisations as well as theoretical and practical tests. Lastly, the Centre approves conditions within aviation concerning the environment and noise."

The "Centre for Transport Markets" conducts all financial regulation as it is considered a domain where synergy effects between the different transport modes can be gained.

Organisation of Trafikstyrelsen

Trafikstyrelsen is organised in thematic Centres, each responsible for a domain in the transport sector – this is depicted in Figure 8.

¹³ Danish Aviation Committee, 2012

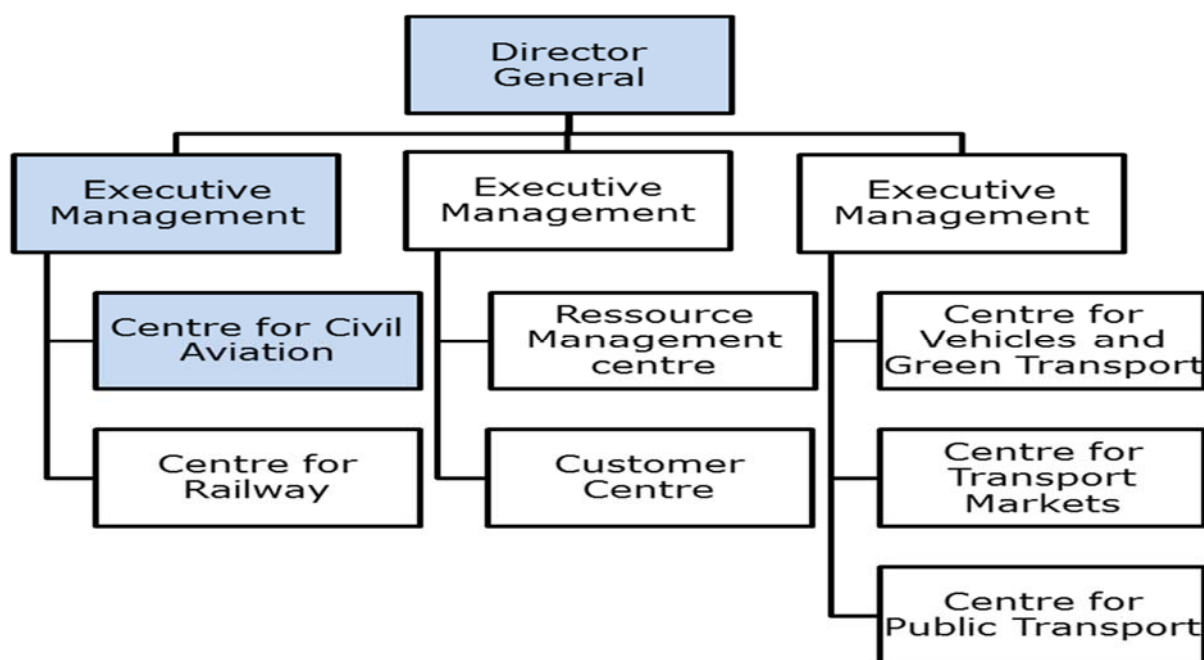


Figure 8 – Organisation of Trafikstyrelsen

Trafikstyrelsen's activities are financed partly from the state budget and partly by fees and charges collected from entities that are subject to oversight. The total expenditure in 2013 was EUR 51.9 million, which resulted in a profit of EUR 1 million. Expenditures directly attributed to aviation tasks was EUR 12.9 million – resulting in a loss of EUR 2 million, compared to the assigned budget and actual income from fees.

In 2013, Trafikstyrelsen's total staff resources comprised 321 FTEs. This is a 15% reduction in total headcount since the 'merger' in 2011, which in itself can be ascribed to synergy effects after merging and reorganising the previously separate authorities. Staff costs accounts for 46% of Trafikstyrelsen's total expenditures.

The distribution of financial and staff resources within the Centre for Civil Aviation between the aviation domains is shown in Figure 9 and Figure 10.

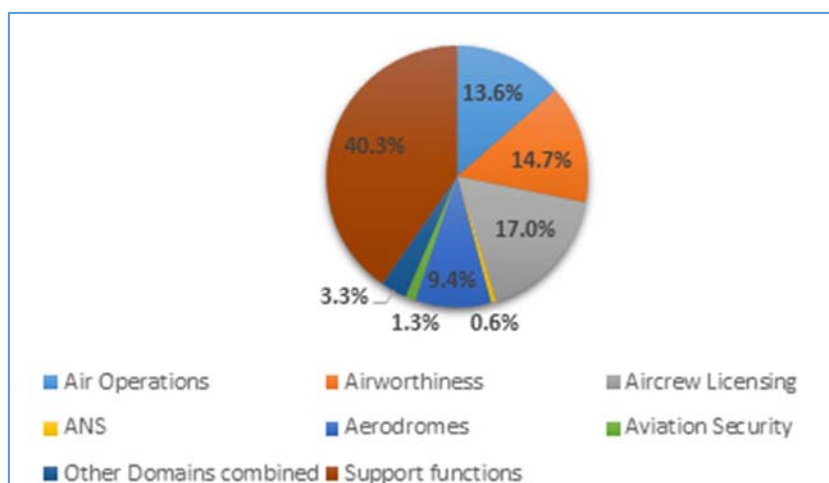


Figure 9 – Distribution of financial resources, Trafikstyrelsen

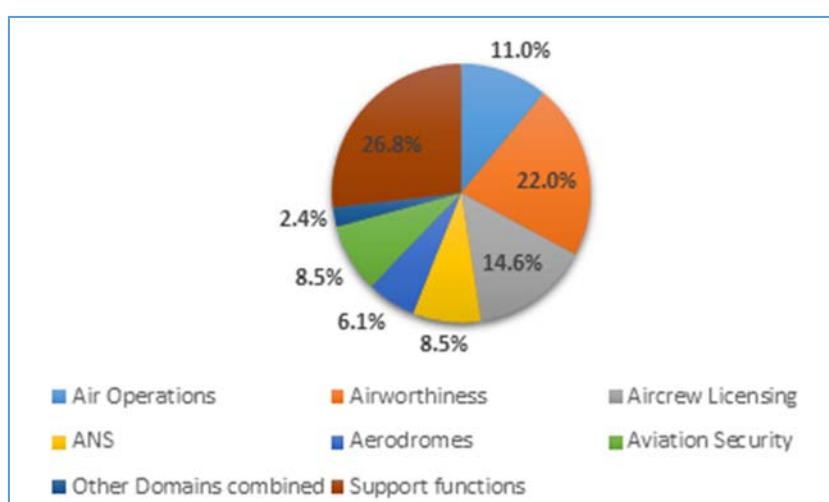


Figure 10 – Distribution of staff resources, Trafikstyrelsen

The gap between reported budget allocation to a domain and reported staff allocation to a domain is likely to be based on different accounting and budgeting mechanisms and organisational structures that do not match the data format requested in the questionnaire.

The numbers provided by Trafikstyrelsen amounted to EUR 10 679 000. However, it became evident that these numbers were referring only to the oversight costs that are financed through fees and charges and did not include rulemaking costs and overhead costs (as were included with all the other CAAs). Based on this and with data from the annual report¹⁴, the comparable aviation costs were established to be EUR 14 576 257.

¹⁴ The Annual Report 2013 is available at <http://www.trafikstyrelsen.dk/DA/Om-Trafikstyrelsen.aspx>

5.2. Trafi – Finland

The Finnish Transport Safety Agency – Trafi – is the integrated State authority responsible for the regulation and oversight of the transport sector in Finland. The Agency started its activities in 2010 as a result of the merger of five sectoral State Authorities (including the Civil Aviation Authority).

Trafi's remit covers all transport domains: aviation, maritime, rail and road transport. Accordingly, Trafi also acts as the Finnish civil aviation authority. As such, the State's national civil aviation authority is mandated with the responsibility for ensuring that air transport is safe and as environmentally friendly as possible. Trafi Aviation considers aviation issues from the perspective of airline passengers, airlines, private pilots and airport operators.

The Finnish Context

Finland has a population of 5.4 million, and the aviation sector contributes with 3.2% to the national GDP and offers employment to 104 000 people.

Aviation is an important part of Finland's functional and effective transport system and one of the main building blocks for the Finnish economic competitiveness. More than 59 500 scheduled international flights depart Finland annually, destined for 87 airports in 38 countries. Domestically, more than 32 600 flights make over 2.5 million seats available to passengers annually, destined to 16 airports¹⁵.

Tasks of Trafi

Trafi has defined its mission as follows:

"Trafi develops the safety of the transport system, promotes environmentally friendly transport solutions and is responsible for transport system regulatory duties".

Trafi's responsibilities include:

- ➔ Issuance of permits, regulations, approvals and decisions
- ➔ Development and adoption of legal provisions regarding the transport sector
- ➔ Arranging examinations, handling of transport sector taxation and registration, and provision of reliable information services
- ➔ Oversight of the transport market as well as of compliance with rules and regulations governing the transport system
- ➔ Participation in international fora (EU, international organisations, etc.)

¹⁵ Oxford Economics, 2011

- Guaranteeing the functionality/continuity of the transport system even in emergency conditions and when normal operations are disrupted
- Promoting the innovative development of intelligent transport
- Information of the public about transport-related aspects

The strategic goals of Trafi are:

- **Influencing:** Trafi shows the way and actively influences the drafting of transport policy and fulfilment of transport policy objectives
- **Customers and services:** Trafi is a pioneer in customer-oriented public services
- **Information:** Transport system development and provision of services to traffic is based on active utilisation of information
- **Personnel:** Trafi is the “best place to work at.”

Organisation of Trafi

Trafi's organisational structure (displayed in Figure 11 below) is composed of four main departments responsible for (1) Regulation and Development, (2) Licenses and Approvals, (3) Oversight, and (4) Data Resources. In addition, there are three overhead support units dealing with (a) Strategy, (b) Communication, and (c) Administration.



Figure 11 – Organisation of Trafi, October 2014

The organisational structure is horizontal – in other words, the departments are structured around thematic aspects, not transport modes. However, the management of Trafi includes Directors responsible for each transport mode.

In 2013, Trafi had a budget of EUR 136 million and its employees logged a total 526 FTEs, of which 108 FTEs were allocated to the CAA functions. Most of Trafi's staff dealing with the aviation domain are based at the Agency's headquarters in Helsinki – however, the aircraft registry is managed from Rovaniemi and some permit & oversight functions from Lappeenranta.

The distribution of financial resources and staff resources between aviation domains is shown in Figure 12 and Figure 13.

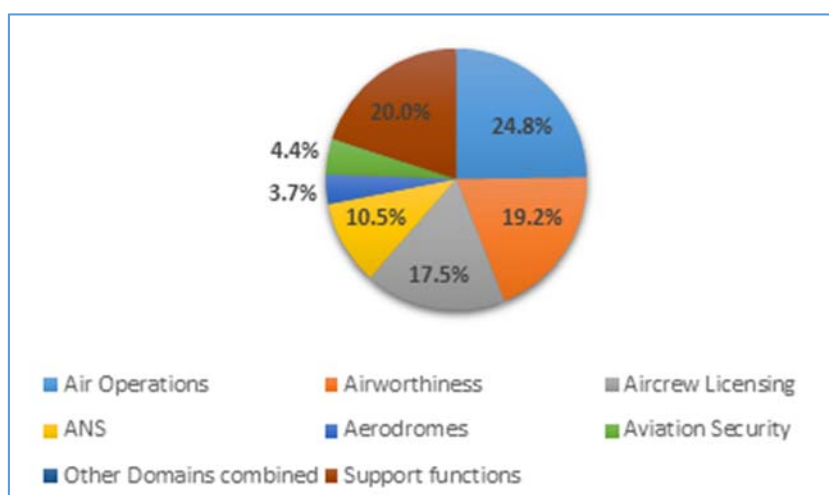


Figure 12 – Distribution of financial resources, Trafi

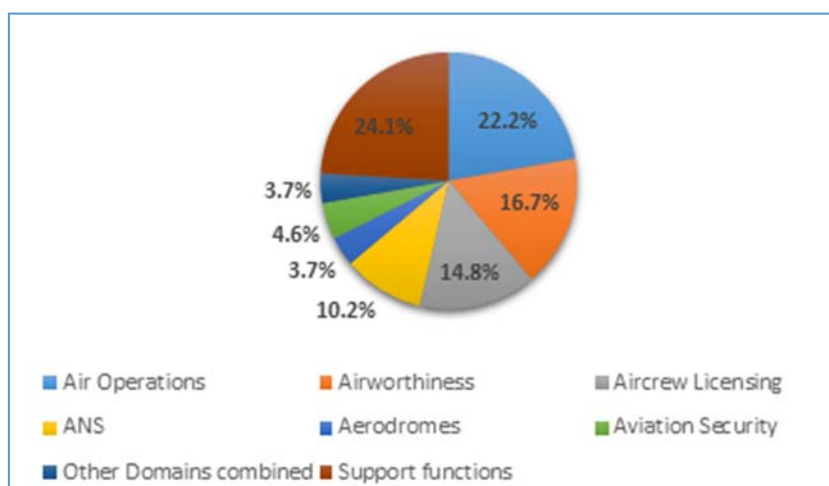


Figure 13 – Distribution of staff resources, Trafi

Trafi's overall income is composed of the following components (2012 data):

- Direct public funding from State budget (24%)
- Registration fees (30%)

- Information service (6%)
- Oversight of technical control system for road vehicles (7%)
- Driving license fees (13%)
- Air transport supervision charge (8%) – paid by departing passengers
- Other chargeable services (12%)

5.3. *Transportstyrelsen – Sweden*

Transportstyrelsen an integrated regulatory agency for all transport modes and was established in 2009 as a result of the merger of the stand-alone transport authorities. Transportstyrelsen has a total of over 1000 employees, of which around 200 employees are allocated to the CAA functions. The civil aviation and maritime expertise has been merged into common units in 2013 and are now fully shared.

Aviation oversight is fully financed through user fees and charges (full cost-recovery), and rulemaking activities are funded through an air passenger charge.

The Swedish Context

Sweden has a population of 9.64 million, and the aviation segment contributes with 1.7% to the national GDP and supports with around 83 000 jobs to the national economy¹⁶. Sweden has a de-regulated ATM market, and the aviation sector is highly competitive. The harmonisation of rules within Europe has enabled companies to establish operations all over Europe as part of the common European market. It is the mission of Transportstyrelsen to ensure that the industry can operate on a level playing field in all European countries.

Around 90 000 scheduled international flights depart Sweden annually, destined for 137 airports in 45 countries. Domestically, more than 57 000 flights make over 4.7 million seats available to passengers annually, destined to 40 airports. The main tasks of Transportstyrelsen is to formulate regulations, to examine and grant permits and to assess the civil aviation sector with particular regard to safety and security. In addition, developments and trends in the aviation market are constantly monitored by Transportstyrelsen.

Transportstyrelsen is responsible for regulatory oversight. Swedavia manages the country's major airports, and Luftfartsverket (LFV) is the state operated Air Navigation Service Provider (ANSP). Sweden is dependent upon efficient domestic air travel connections, although this dependency has declined in recent years due to better road and rail connectivity, and upon international air travel connections due to important European and global markets. Through a combination of increased

¹⁶ Oxford Economics, 2011

competition, attractive prices and a wide variety of destinations, the Swedish air travel market is likely to grow over the coming years.

The largest ANSP, LFV, is a state owned enterprise. LFV handles annually around 700 000 flights carrying 35 million passengers in Swedish airspace and forms a functional airspace block (FAB) in cooperation with Naviar in Denmark.

LFV provides en route air traffic control services from its control centres in Stockholm and Malmö and also provides local air traffic control services at 34 airports, including Stockholm Arlanda, Gothenburg Landvetter, Malmö Sturup and all military airports.

Airport Capacity Resources (ACR) as the first private ANSP currently provides the air traffic services at 12 airports in Sweden: Ljungbyhed, Angelholm, Kalmar, Växjö, Jönköping, Trollhättan, Norrköping, Stockholm Skavsta, Karlstad, Örebro, Västerås and Skellefteå.

Organisation of Transportstyrelsen

Figure 14 shows the organisation of Transportstyrelsen.

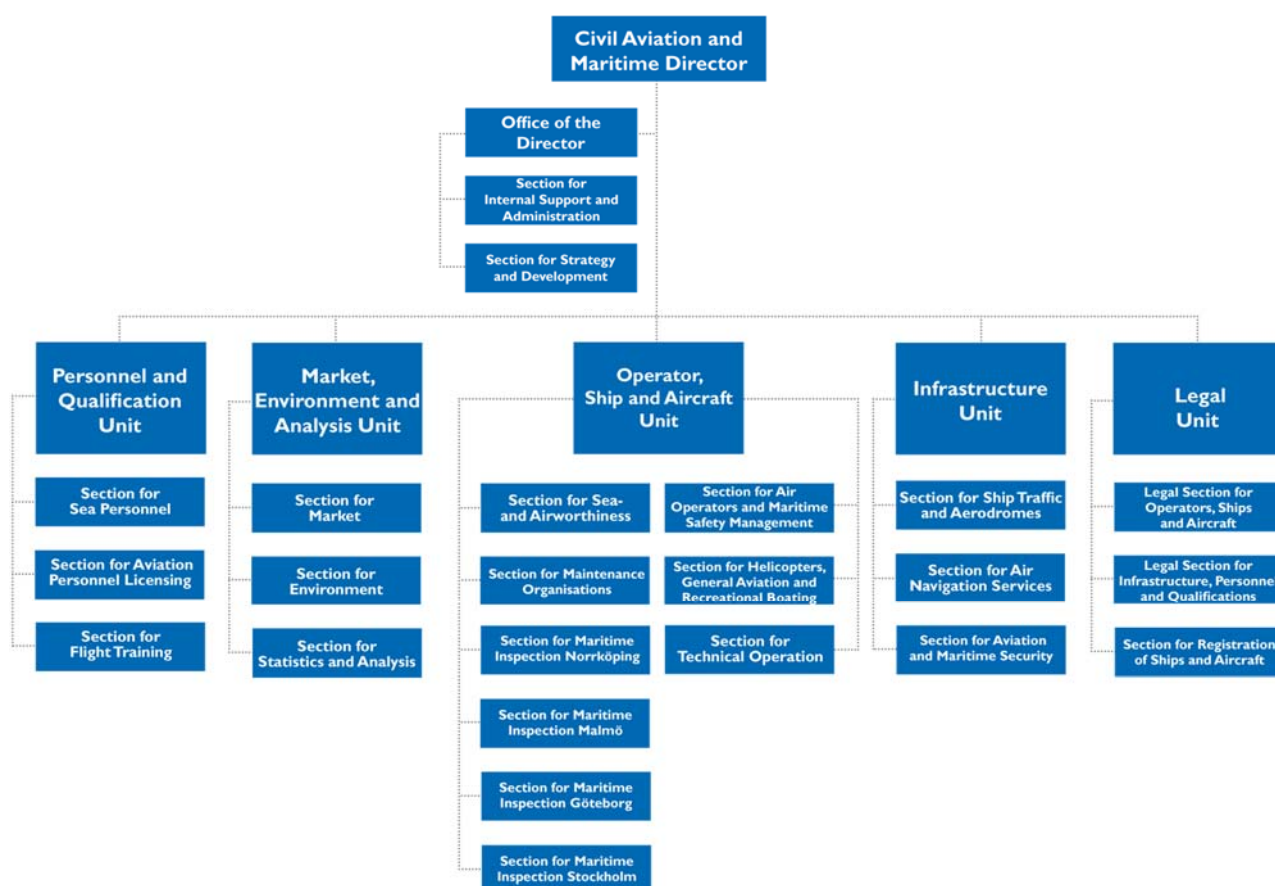


Figure 14 – Organisation of Transportstyrelsen

In 2013, Transportstyrelsen had a budget for the aviation segment of approximately EUR 29 million and its employees logged 206 FTEs. The distribution of financial resources and staff resources between aviation domains is shown in Figure 15 and Figure 16.

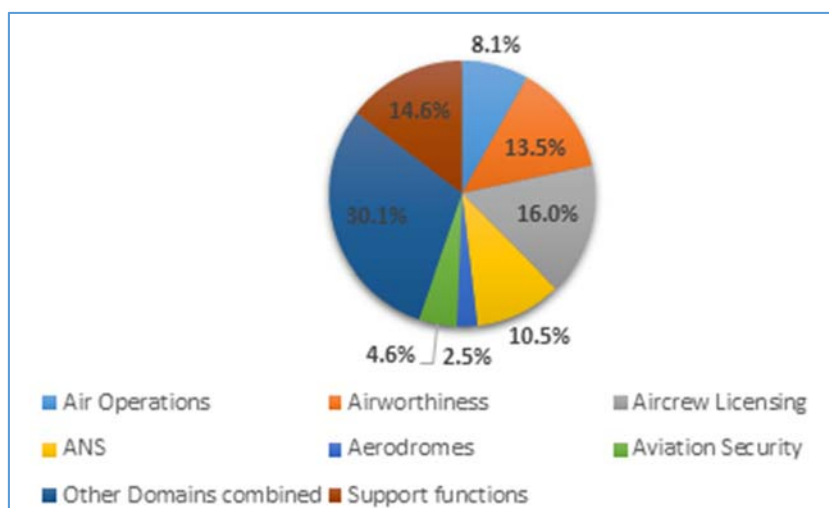


Figure 15 – Distribution of financial resources, Transportstyrelsen

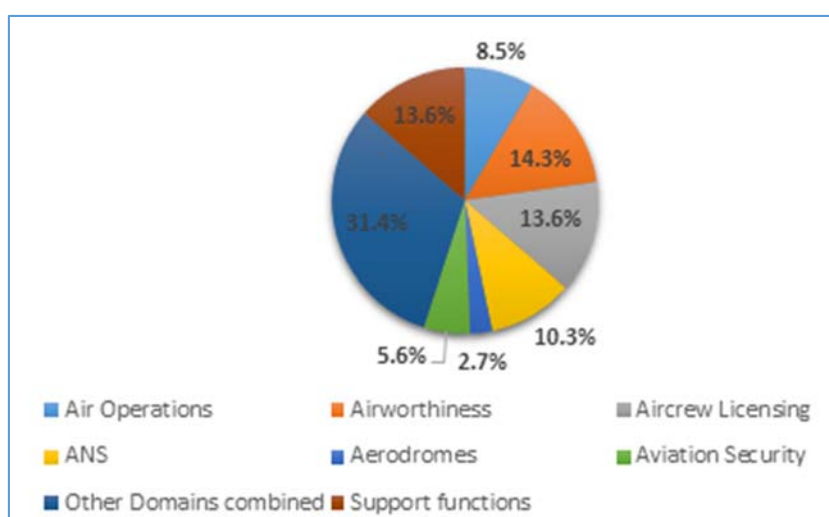


Figure 16 – Distribution of staff resources, Transportstyrelsen

The Swedish Parliament and the Government have decided that the activities of Transportstyrelsen with regard to permits, inspections and record keeping shall mainly be financed through the levying of charges as from 1 January 2011.

The charges that have been determined for Transportstyrelsen's services and products are based on the time needed for processing the respective cases. When little time is spent, the agency only charges a fee equal to the administrative cost of handling the issue and in some cases no charge is levied at all.

The respective agency determines how much it will charge. The charges go into the State Treasury. Transportstyrelsen will then be assigned a grant each year. The grant will be allocated between the departments within Transportstyrelsen so that it corresponds to the charges levied for each transport mode. One transport mode may not finance another (cross-subsidy).

It is noteworthy that the individual aviation domains (Airworthiness, Air Operations etc.) are in comparison relatively small and indicate a high efficiency. Resource allocation in 'other domains' is, however, in comparison relatively large, and it seems fair to note that the allocation of certain functions in the 'other domain' allows for an efficient departmental operation.

5.4. FOCA – Switzerland

The Federal Office of Civil Aviation (FOCA) is responsible for aviation development and the supervision of civil aviation activities in Switzerland. FOCA is part of the Federal Department of the Environment, Transport, Energy and Communications (DETEC) and is charged with ensuring that the high safety standards in civil aviation in Switzerland are maintained, and with pursuing a policy of sustainable development.

One of the central elements of Switzerland's 2004 civil aviation policy report is the principle that in the civil aviation sector, Switzerland wants to achieve a high safety standard in a European comparison.

The civil aviation sector in Europe is largely structured on a cross-border basis. Although Switzerland is not a member state of the EU, it is integrated into the European civil aviation system on the basis of a series of bilateral agreements. Switzerland participates in the liberalised EU aviation market and adopts the corresponding legal provisions and regulations.

In Switzerland, civil aviation safety is regulated by a variety of legal instruments, including regulations and directives of EU, EASA and EUROCONTROL, as well as ICAO standards and Swiss national legislation. Article 87 of the Swiss Federal Constitution stipulates that civil aviation and the corresponding legislation is the responsibility of the federal government. Article 3 of the Swiss Federal Civil Aviation Act assigns the responsibility for oversight in the civil aviation sector to the Federal Council, which fulfils this obligation via the DETEC. The Federal Council may also assign oversight to international institutions. The Federal Office of Civil Aviation (FOCA) is responsible for the direct oversight.

The Swiss Context

Switzerland has a population of 8.02 million, and the contribution of the aviation sector to the national GDP is 1.7% and adds around 87 000 jobs to the national economy. Annually, around 40 million passengers and 300 000 tonnes of freight travel to, from and within Switzerland. More than 198 000 scheduled international flights depart Switzerland annually, destined for 185 airports in 65 countries, while the domestic market, Switzerland being geographically a small country, is limited.

FOCA is not only the direct civil aviation oversight authority, it is also responsible for the preparation and implementation of decisions taken by the Federal Council and Parliament relating to the civil aviation sector, and FOCA is involved in the definition of the general conditions for safe and sustainable air transport. It documents all its activities with the aid of a systematic archiving system.

Organisation of FOCA

Main functions of FOCA organisation include the following elements:

- The Aviation Policy and Strategy division defines the general conditions for the development of civil aviation in Switzerland, which is based on the Federal Council's sustainability strategy that encompasses the economy, the environment and society and is intended to secure the optimal integration of Switzerland into the European and global centres. As Air Traffic Control (ATC) is a crucial component in the area of aviation safety in that it controls airspace and ensures that aircraft are kept at a safe distance from one another. FOCA is responsible for certifying and supervising ATC providers, as well as for issuing operating licences for airports and airfields.
- FOCA performs periodical audits and inspections in order to verify that Swiss operators constantly meet the requirements for an air operators certificate (AOC). While foreign operators are subject to oversight by the relevant authority in State of Registry, FOCA also carries out random inspections of aircraft and crews (ramp inspections) of foreign operators (safety assessment of foreign aircraft, SAFA) in the same way as other European countries.
- Furthermore, FOCA is responsible for the training and licensing of pilots, and operates a licensing bureau for issuing licences for flight personnel and managing and updating pilots' dossiers.
- The Safety Risk Management Division performs a strategic function and therefore reports directly to the FOCA directorate. Its head supports and advises the Director General in the coordination and management of all safety relevant activities of FOCA. It also operates and maintains FOCA's safety management system, details of which are published on the intranet.

Figure 17 shows the organisation of FOCA.

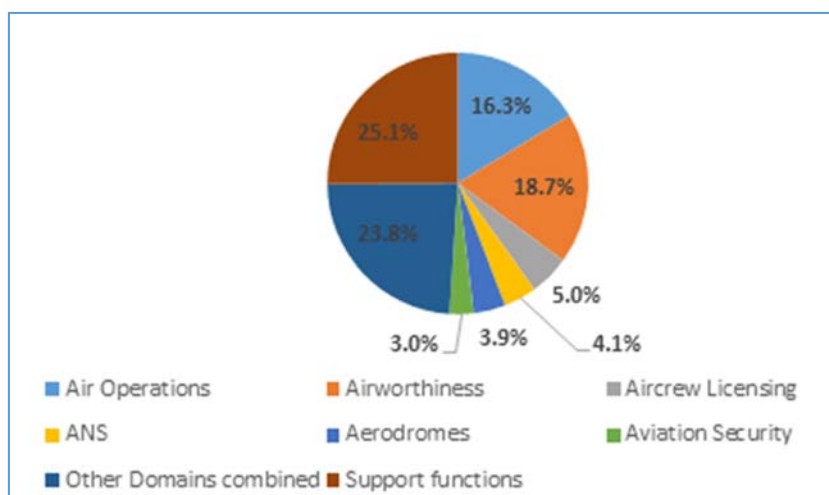


Figure 19 – Distribution of staff resources, FOCA

FOCA covers 17.8% of its overall budget from revenues based on FOCA services, while the remaining 82.3% are covered through the national government budget.

This governmental funding mirrors the national aviation policy. Following a series of accidents and incidents in the years 2000/2001 the national aviation policy was reviewed and based on a NLR report formulating 28 recommendations, re-structured.

As a follow up audit conducted by NLR in 2006 states: “The national aviation safety policy has been completely rewritten and now demonstrates a clear commitment to improve safety. It provides strong guidance, amongst others by explicitly stating that possible costs associated with the targeted increase in aviation safety should be accepted”.

5.5. CAA UK – United Kingdom

The UK Civil Aviation Authority (CAA UK), which is a public corporation, was established by Parliament in 1972 as an independent specialist aviation regulator and provider of air traffic services – the air traffic control body NATS was separated from the CAA UK in the late 1990s and became a public/private partnership organisation in 2001.

The work mission of the CAA UK can be summarised the following way:

- Enhancing aviation safety performance by pursuing targeted and continuous improvements in systems, culture, processes and capability.
- Improving choice and value for aviation consumers now and in the future by promoting competitive markets, contributing to consumers' ability to make informed decisions and protecting them where appropriate.
- Improving environmental performance through more efficient use of airspace and make an efficient contribution to reducing the aviation industry's environmental impacts.
- Ensuring that the CAA UK is an efficient and effective organisation which meets Better Regulation principles

The UK context

In the UK, the aviation sector contributes EUR 49.6 billion (3.6%) to the GDP and contributes with as many as 921 000 jobs to the national economy. From visiting family and friends to shipping high value products, more than 197 million passengers and 2 million tonnes of freight travelled to, from and within the UK. More than 750 000 scheduled international flights depart the UK annually, destined for almost 400 airports in 114 countries. Domestically, over 420 000 scheduled flights provide 35 million seats annually to passengers travelling to more than 60 airports.

Organisation of the CAA UK

The CAA UK employs over 1 000 staff members with a portfolio of expertise that addresses every sector of aviation in the UK.

The CAA UK is divided into three main Groups:

- Safety and Airspace Regulation Group
- Regulatory Policy Group
- Consumer Protection Group

Figure 20 shows the organisation of CAA UK.

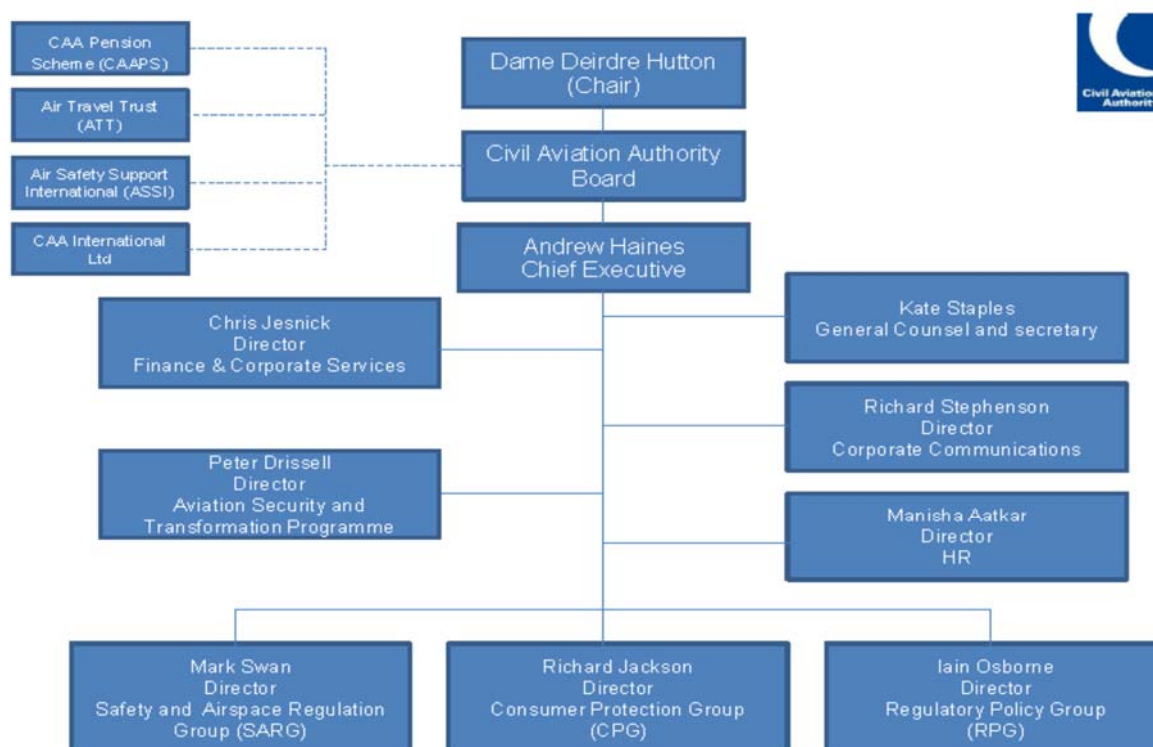


Figure 20 – Organisation of CAA UK

→ **Safety and Airspace Regulation Group**

The role of the CAA UK's Safety and Airspace Regulation Group (SARG) is to ensure that UK civil aviation standards are set and achieved in a co-operative and cost-effective manner. The CAA UK must satisfy itself that aircraft are properly designed, manufactured, operated and maintained; that airlines are competent; that flight crews, air traffic controllers and aircraft maintenance engineers are fit and competent; that licensed aerodromes are safe to use and that air traffic services and general aviation activities meet required safety standards.

The Group is also responsible for the planning and regulation of all UK airspace including the navigation and communications infrastructure to support safe and efficient operations. Staff include civil and military experts with experience of commercial, business, recreational and military aviation. The needs of all users are accommodated, as far as possible, with regard to safety as well as environmental, economic and national security considerations.

→ **Regulatory Policy Group**

The Regulatory Policy Group (RPG) is a new unit that includes work previously organised as the Economic Regulation Group. RPG's remit is to provide policy advice to colleagues across the CAA UK, aiming to help the organisation to put the consumer at the heart of its work.

The new Regulatory Policy Group has four core functions:

- Economic regulation of the three designated airports (Heathrow, Gatwick and Stansted) and NATS
- Enforcement of consumer legislation - for example, to protect consumers in instances of flight cancellation and denied boarding, and protect people of reduced mobility when they fly.
- Providing expert policy and economic advice and analysis across CAA UK, to government and others on airports, airlines and air traffic services
- Collecting and analysing aviation statistics and survey responses

→ **Consumer Protection Group**

The responsibilities of the Consumer Protection Group (CPG) are to

- regulate the finances and fitness of travel organisers selling flights and package holidays in the UK;
- manage the UK's largest system of consumer protection for travellers, Air Travel Organisers' Licensing or "ATOL";
- license UK airlines and enforce European Council requirements in relation to their finances, nationality, liability to passengers for death or injury and insurance; and
- enforce certain other legal requirements and codes of practice for protection of airlines' customers.

The changes are designed to help the CAA UK to take a holistic approach to regulatory aims and ensure that all potential regulatory options are considered when deciding the ideal course of action to achieve best outcomes, across the organisation's work. The changes also underline the Group's

role in providing analytical and policy support across the CAA's mission - for example, on environmental issues.

The CAA UK has a commercial minded approach to its role as the national regulator and is not considered an agency but rather a public corporation. As such, the CAA UK has started to re-structure itself in a different way than most other regulatory agencies. While most regulatory organisations maintain domain specific departments that are utilized to a certain degree, the CAA UK has started to de-departmentalise its structure and has a more flexible organisational structure. Hence, resources are usable for a variety of functions across departments, whereby the organisation itself is able to focus and allocate resources to the areas, where they are most required. In that sense, the CAA UK has internalised the performance-based philosophy in an advanced corporate way.

In April 2014, regulation of aviation security transferred from the Department for Transport (DfT) to the CAA UK. While security policy setting remained the responsibility of DfT, CAA UK is now responsible for oversight and regulation. This organisational change involved the transfer of approximately 93 posts working on regulatory oversight of aviation security.

Also a change in the charging philosophy took place: rather than the activity being funded through general taxation, there is now a charge on the aviation industry to meet the costs. The longer term aspiration of this change is to move towards a more outcome-focused, risk-based approach, which requires substantial co-ordination at European level, where a significant amount of security requirements originates.

In 2013, the CAA UK had a budget of approximately EUR 165.5 million and its employees logged 681 FTEs. The distribution of financial resources could not be broken down within the structure used for this analysis, but the distribution of staff resources between aviation domains is shown in Figure 21.

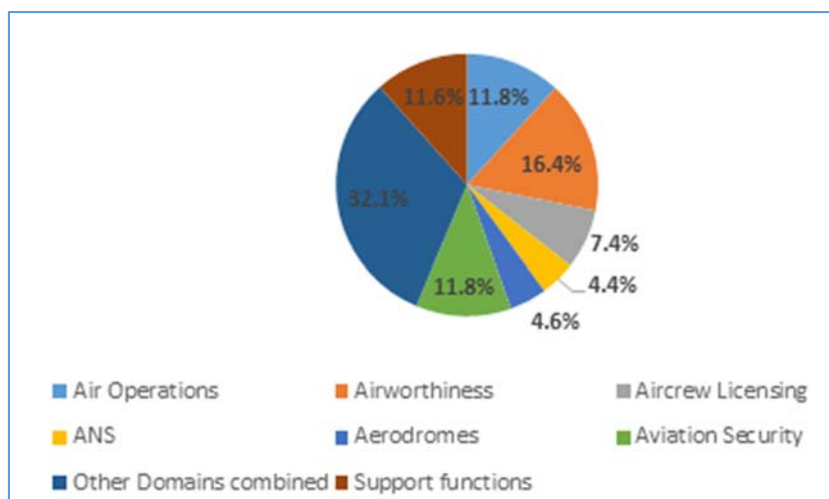


Figure 21 – Distribution of staff resources, CAA UK

5.6. Overview

As mentioned above, none of the European civil aviation authorities performs the role as a 'pure' safety oversight agency. Their particularities appear in Figure 22.

	Luftfartstilsynet (Norway)	Trafikstyrelsen (Denmark)	Trafi (Finland)	Transportstyrelsen (Sweden)	FOCA (Switzerland)	CAA UK (United Kingdom)
EU Member State		X	X	X		X
Implements EU aviation legislation in application of international agreement with EU	X				X	
NEFAB Member State	X		X			
Aviation industry of similar size (based on nr of aircraft in register)	X	X	X	X		
Entity institutionally distinct from other Transport Authorities	X				X	X
Merged with other Transport Authorities		X	X	X		
Mostly self-financed through fees and charges	X	X	X	X		X
Mainly funded from State budget					X	
Commercial activities						X
National enforcement body for aviation consumer protection rules		X	(Partially)		X	X
Low airspace complexity	X	X	X	X		
High airspace complexity					X	X
Oceanic airspace	X					X

Figure 22 – CAA roles - overview

6. Quantitative analysis

The following chapter presents the analysis of the quantitative data collection. It is structured in a way that first provides a more general overview on the resources used by the different authorities before it discusses the in-/output relationships of the different CAA oversight domains. These in-/outputs are set in perspective with the volume of activities in order to understand the size of the domain and allow for comparison.

Caution is recommended when interpreting the column charts describing the 'efficiency' of the individual domains, as different organisational structures allow for a different calculation and booking of domain resources. For example: While one CAA can include certain support functions (e.g.: legal advice, management roles) in the head count of a domain division, another CAA might exclude these resources in the domain head count, however these resources will then be found in the (for example) category 'support functions' (or other).

Where known, these different counting and allocating schemes are explained.

Note: *Not all the CAAs have been able to provide all the data in the format required because of their internal budgeting and organisational set-up, recent or current re-organisations or the inability of their financial departments to provide the data. In the cases/domains where no data was given to Integra, approximations ('best educated guesses') were made based on annual reports, staff numbers and other data obtained from that CAA. It is therefore important to acknowledge that the following figures have to be seen as indicative and represent the Integra interpretation of the obtained data.*

6.1. General overview

This section takes a closer look at the 'input' side within the benchmarked authorities. First of all, it is necessary to examine and compare the total inputs (human and financial resources) of the benchmarked CAAs. The following sections and charts will then be related to the output (services) from the CAAs.

CAA resources – 2013						
	Norway	Denmark	Finland	Sweden	Switzerland	UK
Total staff (FTE)	183.5	82.0	108.0	206.0	299.3	681.1
Total costs (in '000 EUR)	25,129	14,576	20,800	29,343	62,339	165,499

Figure 23 – CAA resources, 2013

Figure 23 shows the overall resources that were available to the benchmarked CAAs in 2013. In this context, it should be noted that EASA has identified and highlighted the lack of resources and of qualified staff as a considerable challenge facing all CAAs in Europe.¹⁷ In this situation, it is important to consider if the CAAs are making the best possible use of their resources.

Total expenditure and state funding

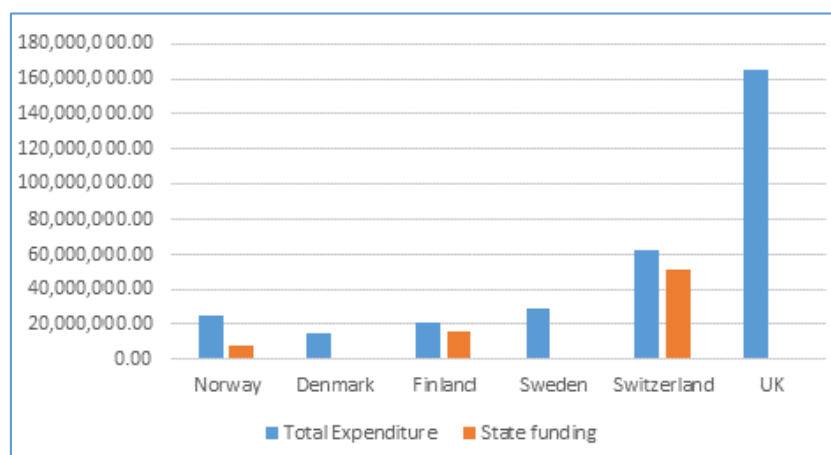


Figure 24 – Total expenditure and state funding (in EUR)¹⁸

Figure 24 shows the annual total expenditure and the funding from state budget (calculated in €) for the CAAs as reported in 2013. These numbers include all the costs that annually accrue for the selected CAAs. To a certain degree, these costs reflect the national context whereby (amongst others) salaries, pension plans and living costs differ substantially. The Nordic countries all appear to be operating in comparable environments and with comparable budgets, while Switzerland and especially the UK are operating in larger markets.

However, as the total expenditure numbers only consider the cost side, these numbers (shown in blue columns) in themselves have no indicative weight when looking at the efficiency of an organisation. Despite the impact of the national cost level, which is in particular valid for Switzerland and Norway, it appears that the organisations, in which regulation and oversight of more than one transport mode have been merged to some degree (in Denmark, Finland and Sweden), are able to achieve some cost synergies based on their organisational structure.

Costs, however, must to be considered in combination with revenues in order to understand the CAA costs that are funded by taxpayers (from the State budget), in contrast to the costs charged to service users (through service charges and fees).

¹⁷ EASA Opinion No 01/2015, issued in preparation of a possible revision of the EASA Basic Regulation 216/2008

¹⁸ For Denmark, no data concerning State funding has been made available.

The amount of state funding between the CAAs varies substantially. While some countries such as Sweden and the UK have full cost-recovery for their CAAs through charges and fees, others mainly receive state funding as their budgets are only partially covered through generated revenues. The Norwegian CAA is at the lower end of the spectre with a 28.7% coverage of their budget through state funds while Finland with 76% and Switzerland with 82% have only a small part of their budgets covered through generated revenues.

In the context of the 'Value for Money' philosophy, it is in the interest of the tax paying public to limit governmental funding to the necessary minimum. Following this view, the size of the blue column is irrelevant while the orange column should be as small as possible.

Total expenditure at purchasing power parity

When examining the budgets of the benchmarked CAAs, it is necessary to bear in mind that the price levels of the countries concerned are not equal. It is, however, possible to compare the budgets at purchasing power parity (PPP), i.e. taking account of price level differences across countries. This method is widely used for economic research and policy analysis that involves inter-country comparisons.

Figure 25 below shows the PPP price level index (2013) published by Eurostat, applicable in respect of the countries examined in the present study. The baseline (index value = 100) represents the EU average price level – the higher the value displayed for a specific country, the higher the general level of prices in the country (e.g. in Norway, the general level of prices is around 56% higher than the EU average).

Norway	156.1
Denmark	136.3
Finland	123.4
Sweden	134.8
Switzerland	148.4
United Kingdom	108.9

Figure 25 – Price Level Index (2013) – Source: Eurostat

Figure 26 below shows, for each benchmarked CAA, both the nominal budget (2013) converted in EUR as well as these values adjusted to the price level in Norway and thus directly comparable with the budget of Luftfartstilsynet.

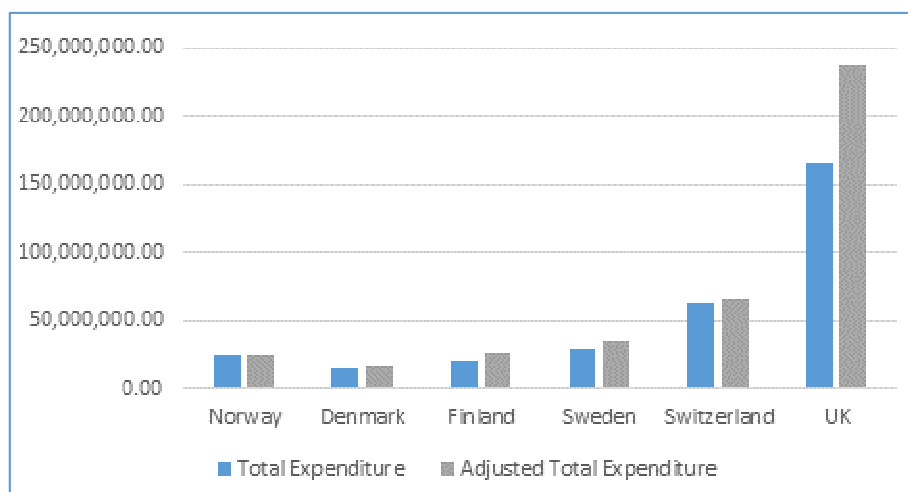


Figure 26 – Total expenditure (in EUR) with adjusted cost index

Number of CAA staff / million inhabitants

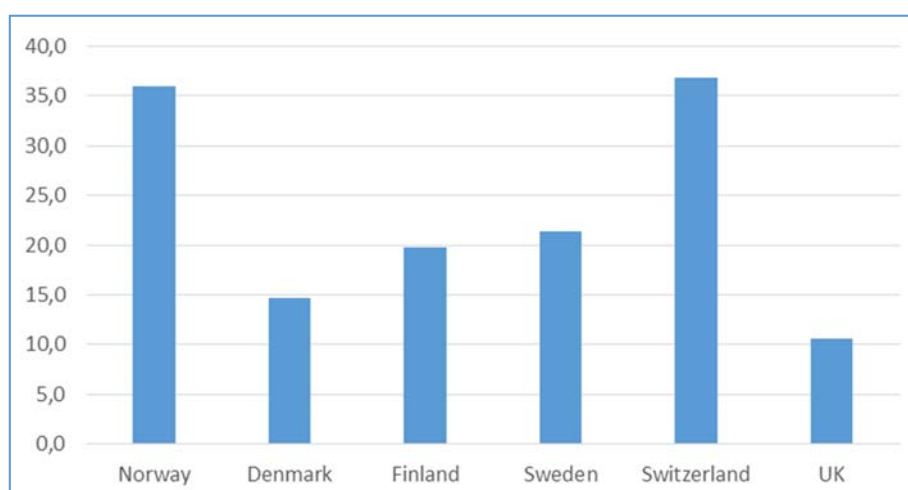


Figure 27 – CAA employees per million inhabitants

Figure 27, illustrating the number of CAA employees per million population, provides a view on the relative size of the CAA in relation to the population. The 'stand-alone' CAAs in Norway and in Switzerland appear to be requiring more staff for in the execution of their tasks than those authorities, which are sharing certain overhead services and functions such as Finland, Sweden and Denmark. A comparison of these countries is particularly valuable as the size of the populations is comparable with Norway having smallest population (5 109 056) and Sweden the largest population (9 644 864). In this particular comparison, Norway and Switzerland use around 35 employees per million inhabitants, while the other countries use between 10 and 20. As the UK population is significantly larger, it appears that scale effect from operating a larger market allow for such a ratio. A comparison with countries of similar size to test that assumption has not been made.

Number of aircraft on register per CAA FTE

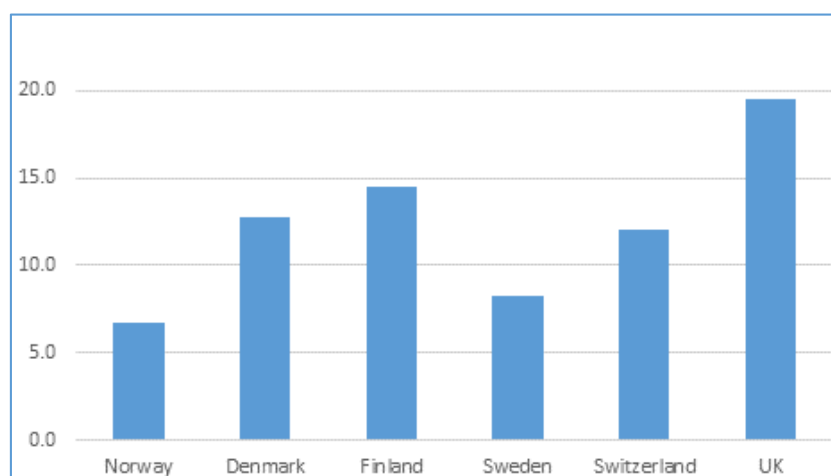


Figure 28 – Number of aircraft on register per CAA FTE

In order to appraise the CAA staff numbers in conjunction to the supervised national aviation industries, Figure 28 shows the number of aircraft on register per CAA FTE for each country. The observed values vary from approximately 7 registered aircraft/FTE for CAA Norway to around 20 registered aircraft/FTE for CAA UK. The number of aircraft considered for this indicator comprises the aeroplanes and helicopters on register, which have an EASA Certificate of Airworthiness or meet the criteria of Annex II to EU Regulation 216/2008 (i.e. "non-EASA aircraft").

Key findings

- ➔ There are large differences in CAA budgets (from €14 million to €160 million).
- ➔ Stand-alone CAAs appear to require more staff than comparably sized shared-services organisations.
- ➔ Larger countries/organisations appear to be able to yield significant scale effects.
- ➔ Comparison between organisations is not clear-cut possible as staff working in shared services is not visible in the organisational chart.

6.2. Aircrew Licensing

The Aircrew Licensing domain is defined by ICAO Annex 1 and related EU regulations, i.e. Commission Implementing Regulation 1178/2011.

Licensing is the act of authorising individuals to perform defined activities, which should otherwise not be allowed due to the potentially serious outcomes in case such activities being performed improperly. Any applicant for a license must meet certain stated requirements, proportional to the complexities of the task to be performed. The licensing examination serves as a regular test of physical fitness and performance ensuring independent control. As such, training and licensing together are critical for the achievement of overall competency.

Figure 29 shows the number of pilot licenses currently under supervision for each of the benchmarked CAAs, referring to Airline Transport Pilot License (ATPL), Commercial Pilot License (CPL) and Private Pilot License (PPL) as defined by EASA, and illustrate the relative sizes of the pilot segments in the countries.

It should be noted that micro light or glider licenses issued by a CAA are not included here as this licensing process is not yet harmonised by EASA and hence makes a comparison difficult to evaluate.

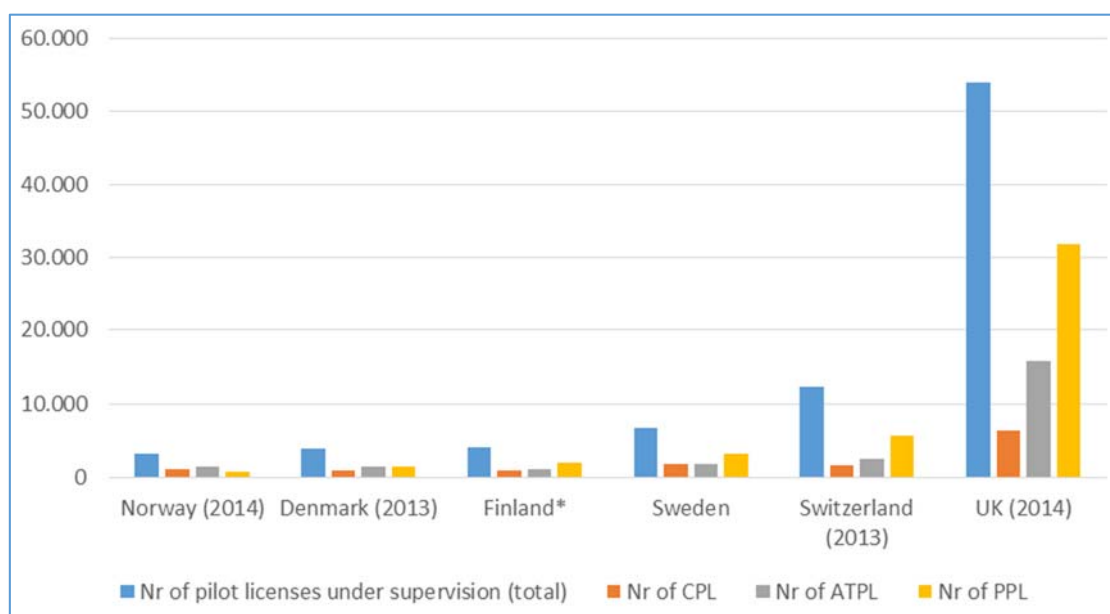


Figure 29 – Number of pilot licenses under supervision

Based on the figures it appears fair to say that the Aircrew Licensing domains in Norway, Denmark, Finland and Sweden are similar in size with Norway having the lowest numbers of licenses (3 177) and Sweden having more than double this number (6 661). Switzerland has double the numbers of Sweden under supervision (12 240), while the UK with 53 981 licenses is a bigger market than the other countries combined. While this chart only looks at the sizes of the markets, the next figure takes into account the sizes of the respective departments dealing with licensing.

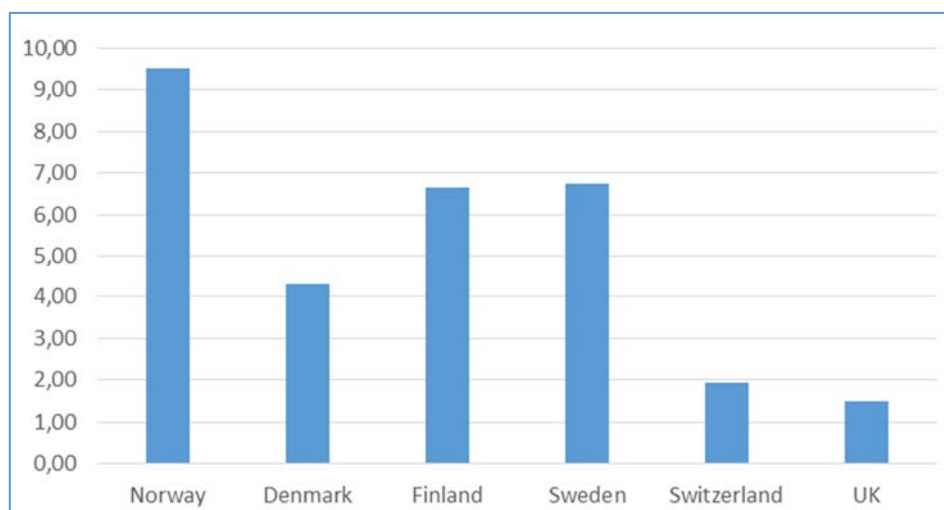


Figure 30 – CAA domain hour per license under supervision

When addressing efficiency of any given process, the aim is to understand the amount of inputs used to achieve a desired output. Figure 30 shows the average hours spent per license by the different CAAs – or to be more accurate, hours spent in average by CAA staff allocated to that specific domain.

The results indicate that the average time amount spent on a license in Switzerland and particularly in the UK – the two countries with the highest number of personnel licenses – is significantly shorter than in the other countries¹⁹.

This can be seen as an indication that scale effects and efficiency can be achieved if working in larger segments. As certain competences are required, regardless the size of the segment, it appears that the utilization of these resources can be optimised in larger segments where constant 'queuing' assures a stable workload.

¹⁹ The calculation is based on the amount of FTEs/domain unit and the annual average hour work time as published for every country by OECD: <http://stats.oecd.org/index.aspx?DataSetCode=ANHRS>

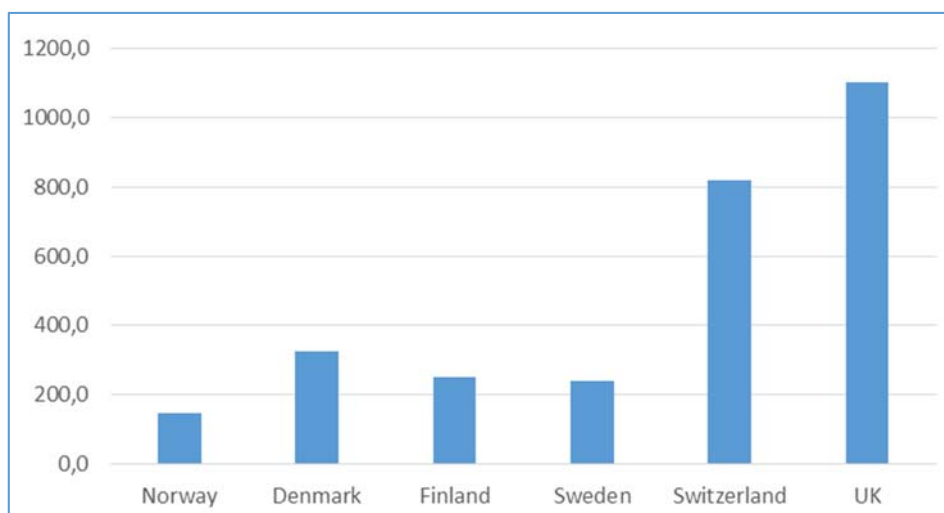


Figure 31 – Number of pilot licenses per domain FTE

Figure 31 shows the ratios between CAA employees (in the licensing domain) and the amount of licenses 'processed' by one domain FTE. Not surprisingly, and in line with the chart showing person hours used for one license, in Switzerland and in the UK one domain FTE processes up to four times the amount of licenses than in Norway or Finland. The relative large gap between the authorities can be an indication that a larger volume of licenses to be processed allows scale effects to be achieved. In addition, the gap may result from different levels of maturity of IT applications used in the licensing process.

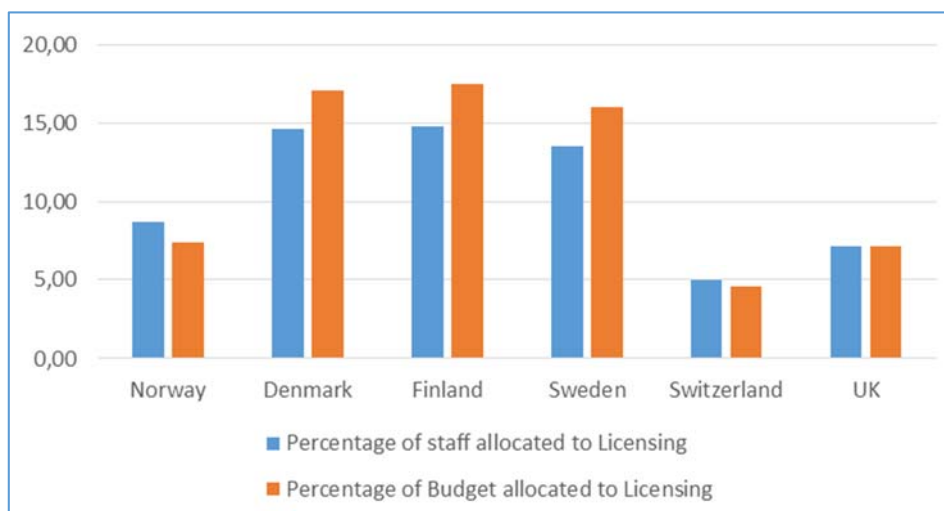


Figure 32 – Relative size of Licensing Departments

Figure 32 summarises the section on Aircrew Licensing by simply showing the CAA internal allocation of resources (staff and budget) to this domain.

The CAAs in Denmark, Finland and Sweden show a higher relative allocation of staff and budget to the licensing domain than Norway and Switzerland. This is most likely related to the organisational structure of these CAAs. The CAAs that have merged (fully or partly) with other authorities are – in comparison to the stand-alone CAAs – smaller aviation authorities. Hence, as

licensing departments are comparable in absolute size, their relative size in respect to the overall organisation is larger, which is also illustrated by the figure below.

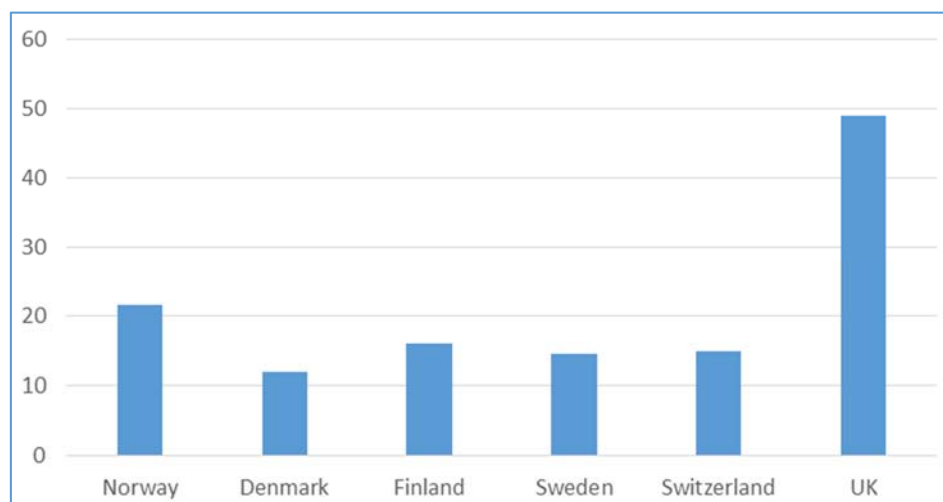


Figure 33 – Number of FTEs allocated to Aircrew Licensing

Figure 33 shows that the absolute number of staff working with licensing is comparable in all organisations except the UK, which works a licensing segment four times the size of Norway's.

Key Findings

- ➔ Organisations processing larger amounts of licenses seem to be able to benefit from scale effects (Switzerland, UK).
- ➔ Efficiency increases can be achieved through enhanced usage of IT applications.
- ➔ Significant variation in the productivity/employee and hours/per license is observed.
- ➔ Norway appears to perform licensing relatively staff-intensely.

6.3. Air Operations

The Air Operations domain is defined by ICAO Annex 6 and related EU regulations, i.e. Commission Regulation 965/2012. The essence of Annex 6, simply put, is that the operation of aircraft engaged in international air transport must be as standardised as possible to ensure the highest levels of safety and efficiency.

Figure 34 illustrates the sizes of the Air Operations segment and the sizes of the departments working in this domain.

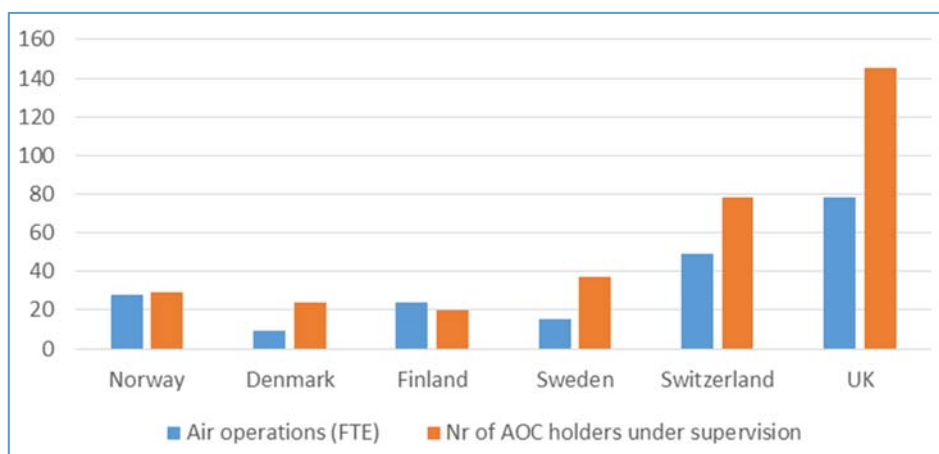


Figure 34 – Number of Air Operations FTEs and AOC Holders under supervision

As there is a big variation in the size and in the organisational complexity of the individual AOC Holders, the workload associated to the supervision of an AOC can vary substantially. However, in the context of this study it is assumed that the variation between the AOC Holders is similar in all benchmarked countries.

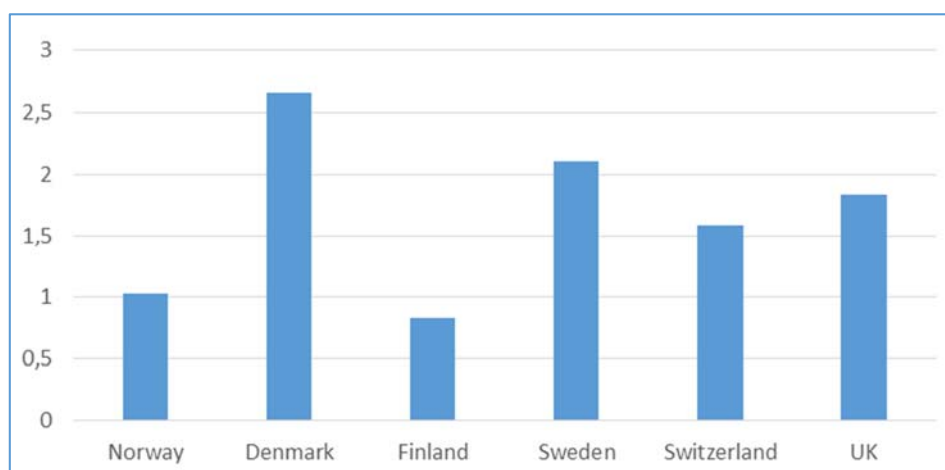


Figure 35 – Number of AOC Holders under supervision per domain FTE

Figure 35 builds on this data and illustrates the number of AOC Holders per domain FTE.

The results from this comparison range between 0.83 AOC Holders per domain FTE for Finland to 2.66 for Denmark – or to say it differently: while one CAA employee allocated to Air Operations in average manages 2.66 AOC Holders in Denmark, this number is 0.83 for Finland.

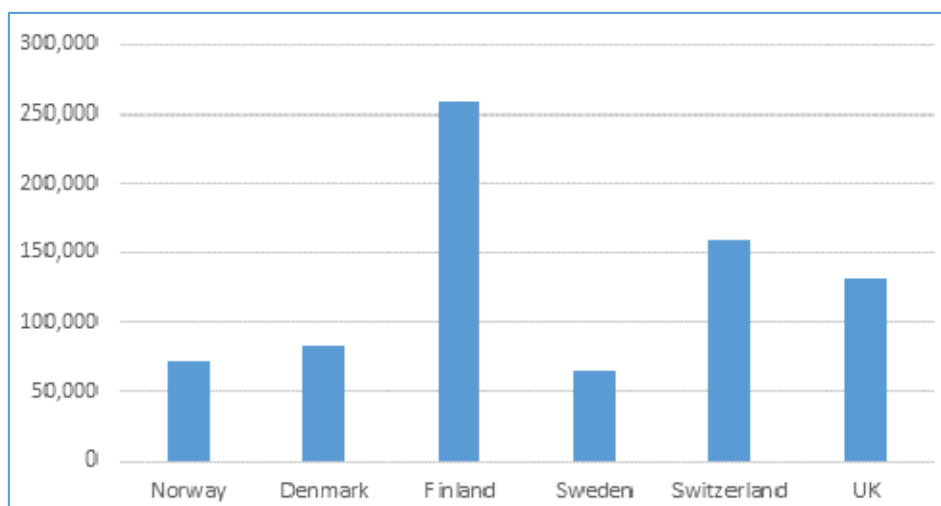


Figure 36 – Expenditure per AOC Holder

Figure 36 illustrates the costs occurring within CAA in connection with the oversight of a single AOC. The costs range from €64 526 in Sweden to €258 412 in Finland. Norway is – together with Sweden – at the lower cost end of the spectre with €72 614.

Key Findings

- ➔ In the Air Operations domain, Luftfartstilsynet's cost-efficiency is found to be at a comparable level with the CAAs of Denmark and Sweden.

6.4. Airworthiness

The Airworthiness domain is defined by ICAO Annex 8 and related EU regulations, i.e. EASA Part 21 (contained in Commission Regulation 748/2012) and EASA Part M, Part 145, Part 66, Part 147 – (contained in Commission Regulation 1321/2014).

In the interest of safety, an aircraft must be designed, constructed and operated in compliance with the appropriate airworthiness requirements of the State of Registry of the aircraft. Consequently, the aircraft is issued with a Certificate of Airworthiness declaring that the aircraft is 'fit to fly'.

Figure 37 illustrates the allocation of resources (staff and budget) to Airworthiness within the benchmarked authorities as well as the relation between the resources and the numbers of aircraft on register and approved maintenance organisations.

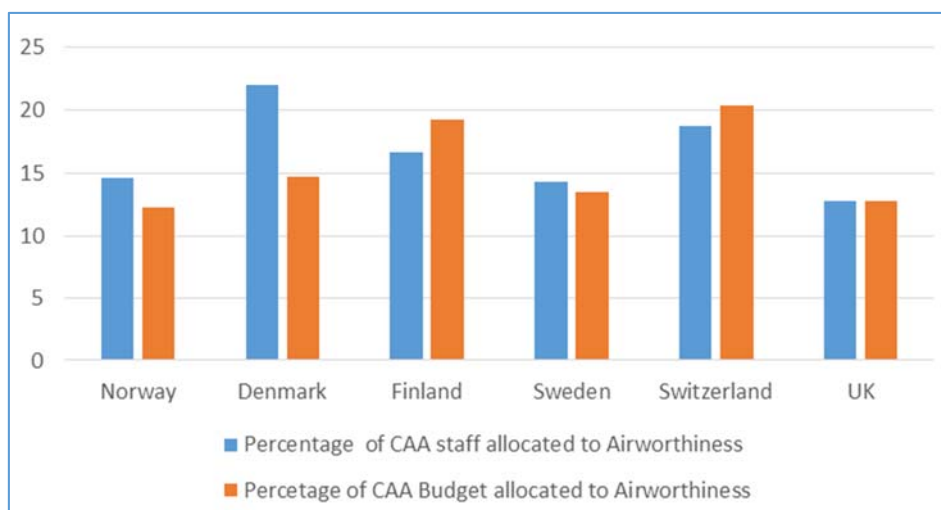


Figure 37 – Relative size of Airworthiness domains

Overseen aircraft and organisations per domain FTE

The airworthiness domain encapsulates CAA responsibilities with regard to:

- the issuance of initial Certificates of Airworthiness and of subsequent airworthiness review certificates
- the approval and oversight of Continuing Airworthiness Organisations, which include Continuing Airworthiness Management Organisations (CAMOs), Maintenance Organisations (AMOs) approved either under Part 145 or Part M subpart F, as well as Maintenance Training Organisations (MTOs) approved under Part 147.²⁰

For the purpose of measuring CAA efficiency in the field of airworthiness, both of the aforementioned are considered relevant as both the number of supervised aircraft²¹ and of approved continuing airworthiness organisations impact the CAA workload.

Figure 38 shows how staff resources are utilised on these main activities in the field of airworthiness.

²⁰ Parts referring to Annexes of Commission Regulation 1321/2014.

²¹ The CAA is responsible for the issuance and oversight of certificates of airworthiness which directly relate to the number of aircraft concerned. Furthermore, Commission Regulation 1321/2014 specifically requires CAAs to take account of the number of aircraft on the register when developing its programme for aircraft continuing airworthiness monitoring.

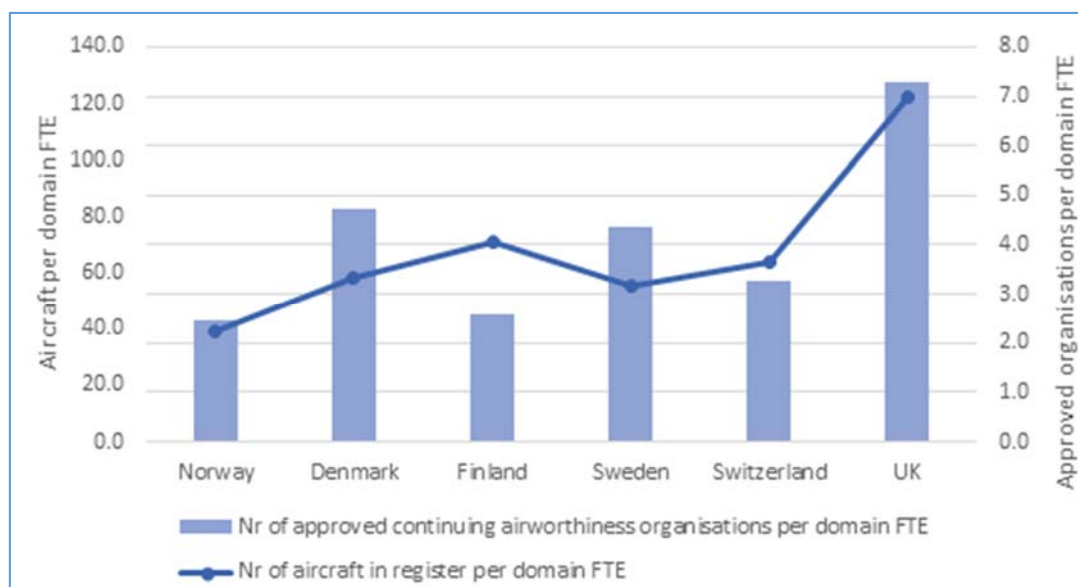


Figure 38 – Number of approved organisations and aircraft on register per domain FTE

Based on the feedback received from CAA Norway, it is acknowledged that CAAs' workload in the airworthiness domain usually relates mostly to the oversight of approved organisations. Hence, the indicator based on the number of approved organisations has to be regarded as the key efficiency metrics, complemented by the secondary indicator based on the number of aircraft in register.

Figure 38 shows a split picture. The 'efficiencies' with regard to overseen entities – both approved continuing airworthiness organisations and aircraft on register – are within a comparable range in the Nordic countries and Switzerland, whereas the UK has clearly higher values. Within the group of Nordic CAAs, these values vary from around 2.5 approved organisations per domain FTE for Luftfartstilsynet to approximately 4.5 approved organisations per domain FTE for Trafikstyrelsen.

The differences observed in Figure 38 can possibly be linked to scale effects generated by a larger industry as well as to the specific local characteristics of the supervised industry. In this context, it should be noted that Luftfartstilsynet oversees a relatively high number of maintenance line stations.

Figure 39 displays the costs that accrue for each CAA per aircraft on register and shows that the costs per aircraft on register vary between €1 000 from the UK and Denmark up to €3 500 in Switzerland. Norway and the Nordic countries have very comparable costs per aircraft in register.

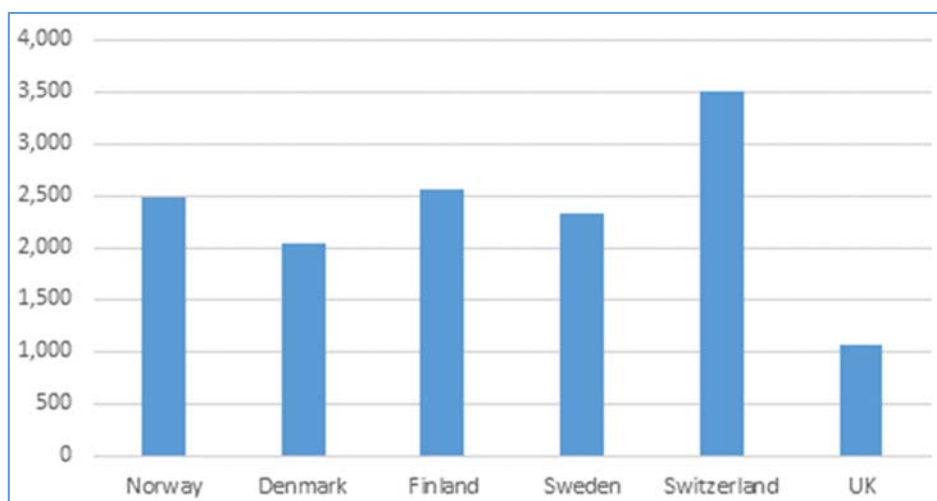


Figure 39 – Costs per aircraft on register

Key Findings

- ➔ There is a significant efficiency difference between UK and the other countries (a detailed comparison between the Nordic countries can be found in Section 6.11).

6.5. Air Navigation Services

The Air Navigation Services domain is defined by ICAO Annex 11 and related EU regulations, i.e. EU Regulation 549/2004. Annex 11 contains important requirements for States to implement systematic and appropriate air navigation services (ANS) safety management programmes to ensure that safety is maintained in the provision of ANS within airspaces and at aerodromes. Safety management systems and programmes will serve as an important contribution toward ensuring safety in international civil aviation.

Staff and Budget Allocation to ANS

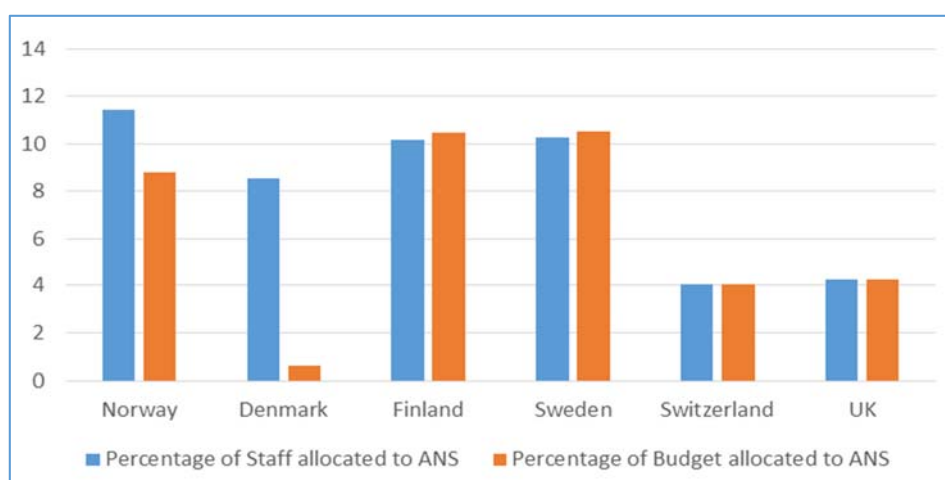


Figure 40 – Resource allocation to ANS domain

Figure 40 indicates that there is a significant variation in resource allocation to ANS between the benchmarked CAAs. While Sweden, Switzerland and the UK are using less than 5% of their budget and staff resources in the ANS domain, this allocation is around 10% in Norway, Denmark and Sweden. It is noteworthy that the overall organisational structure (shared services) does not appear to impact the allocation of resources to ANS.

Number of certified ANSPs per domain FTE

When appraising the use of CAA resources in the field of ANS, it is essential to consider in particular the number of air navigation service providers under the CAA's supervision.

Figure 41 features the number of ANSPs under the supervision of the benchmarked CAAs. The number of overseen ANSPs varies considerably within the comparator group, from three ANSPs in Switzerland to 61 in the UK. Sweden has a relatively high number of different CNS and MET providers (in relation to the provision of terminal air navigation services), which explains the relatively high total number of ANSP organisations.

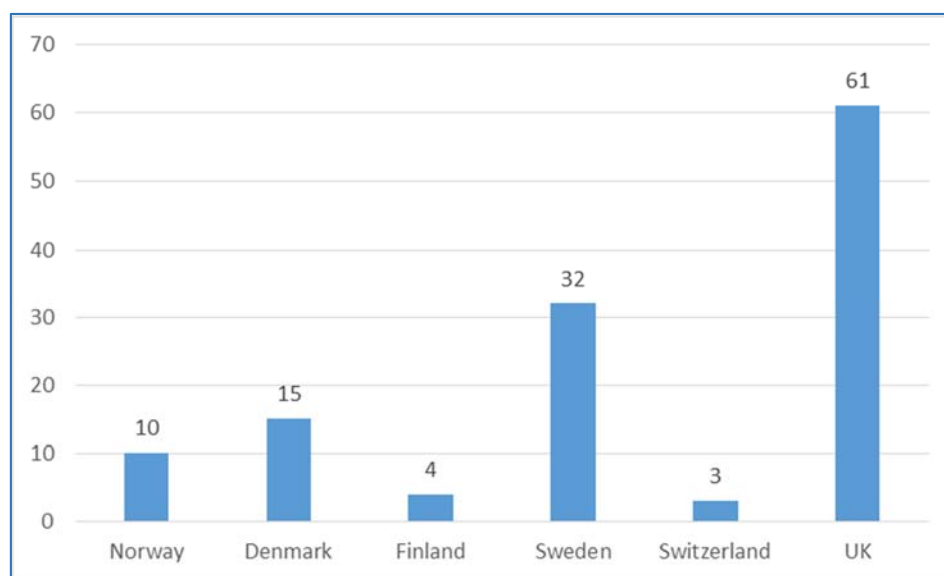


Figure 41 – Number of ANSPs under supervision

It is important to note that the number of certified ANSPs displayed in this chart relates to the number of supervised organisations²². Therefore, when an ANSP is certified to provide a bundle of several different air navigation services (e.g. ATS, CNS, MET, AIS), it is counted only once.

²² In order to ensure the comparability of data concerning the number of supervised ANSP organisations, we have made use of the country-specific figures published by EASA in the document referenced “NPA 2013-08 (D)”.

Figure 42 illustrates the number of ANSPs under supervision per domain FTE in each of the benchmarked CAAs.

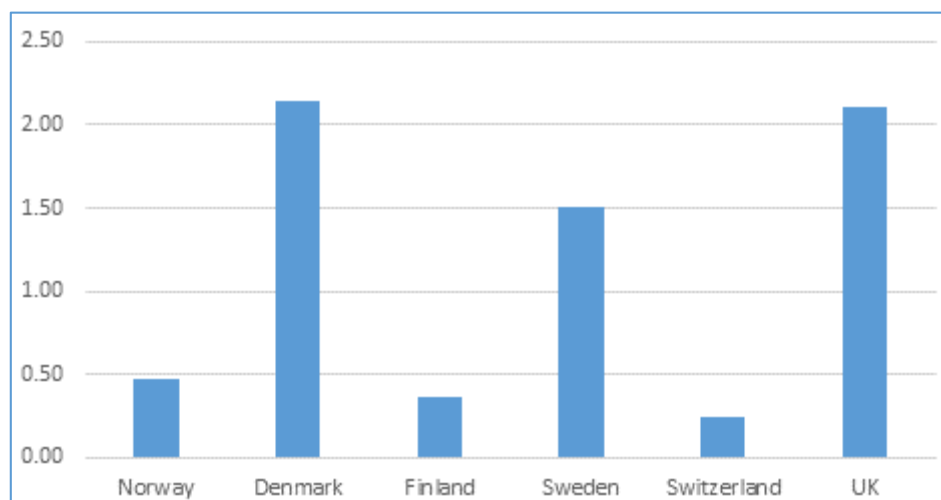


Figure 42 – Number of certified ANSP organisations per domain FTE

The values recorded for this indicator show a difference between two groups of CAAs: on the one hand Norway, Finland and Switzerland, on the other hand Denmark, Sweden and the UK.

However, it is not possible to draw any firm conclusion based on these results, as they are strongly driven by the number of supervised ANSP organisations but do not reflect the size, scope and complexity of the aforementioned organisations (which are also essential factors affecting the CAA workload). Moreover, the ANS domain is characterised by a number of regulatory tasks and dimensions (such as functional airspace blocks and performance planning), where the workload does not directly depend on the number of supervised ANSP organisations.

Number of certified ATSPs per domain FTE

In the light of the observations above, it is deemed appropriate to place a specific focus on air traffic services (ATS) which are at the core of the ANS business, and which are subject to a considerable number of regulatory requirements and high operational/technical complexity.

Figure 43 reflects the number of certified air traffic service providers per domain FTE. It has to be read in conjunction with Figure 44 (which shows the same value when taking into account the total number of ANSP organisations).

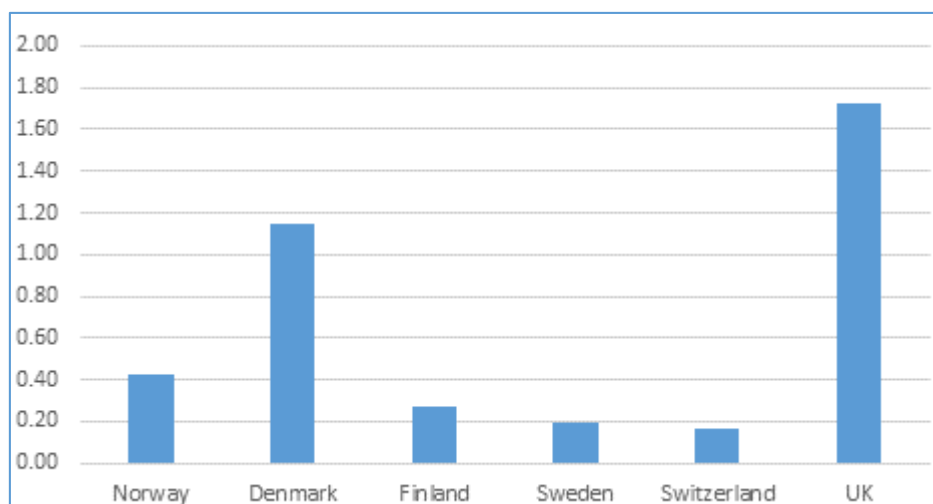


Figure 43 – Number of certified ATSPs per domain FTE

Based on Figure 42 and Figure 43, it appears that Trafikstyrelsen (Denmark) features the best performance among Nordic countries, whereas the values Luftfartstilsynet and TRAFI are quite similar. However, the results from figures can only be regarded as indicative, in the light of the caveats spelled out under Figure 42.

Number of ATCO and FISO licenses per domain FTE

Figure 44 illustrates the combined number of air traffic control officers (ATCO) and flight information service officers (FISO) under supervision per domain FTE. These numbers should be considered in the context with the resources allocated to the ANS domain, as they not only relate to the CAA workload (issuance and supervision of licenses) but also reflect the size of the supervised national ANS industries.

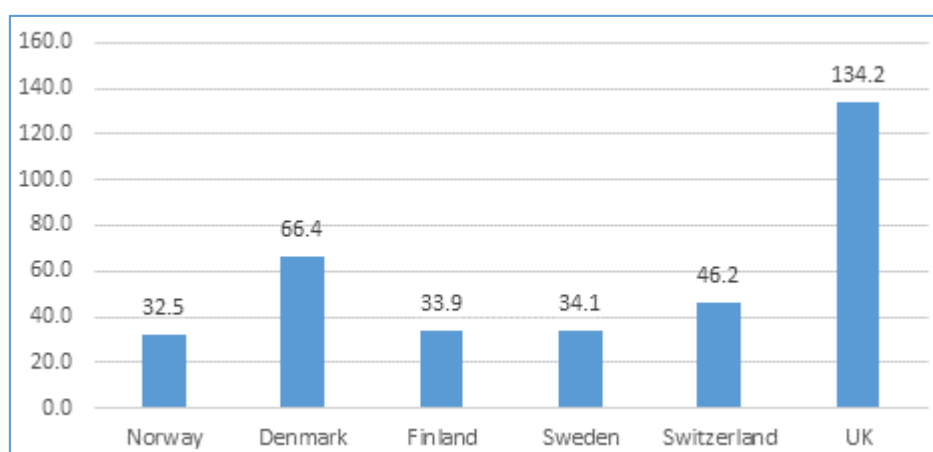


Figure 44 – Number of ATCO and FISO licenses per domain FTE

The figure shows that Luftfartstilsynet is at the low end of the spectrum with 32,5 licenses per ANS domain employee, while this number is 66,4 for Trafikstyrelsen and 134,2 for the CAA UK.

The size of AFIS operations in the different countries varies significantly with the UK having as many as 1 750 FISOs and Switzerland having only five. These number highlight the difference between the CAA UK and 'the rest' in as the CAA UK dedicated employee has responsibility for more than twice the amount of the dedicated employee in Trafikstyrelsen and three times the amount of the dedicated employees in all the other CAAs.

Considerations concerning ANS complexity

Under the assumption that the volume of oversight of an ANSP depends to some degree of the size of the ANSP, its volume of activities, the complexity of its operational environment and the maturity of its SMS, the next figures describe the ANSP environment within the selected countries.

Figure 45 shows the average number of daily IFR traffic in the respective countries and sets these numbers in relation to the Eurocontrol Airspace Complexity score for the national airspaces. Combined, these data provide an overview on the working arena for the national ANSP. While the amount of IFR traffic in Denmark, Norway and Sweden is comparable, Finland shows a lower and Switzerland a higher level of activity, while the UK has double the traffic than Switzerland.

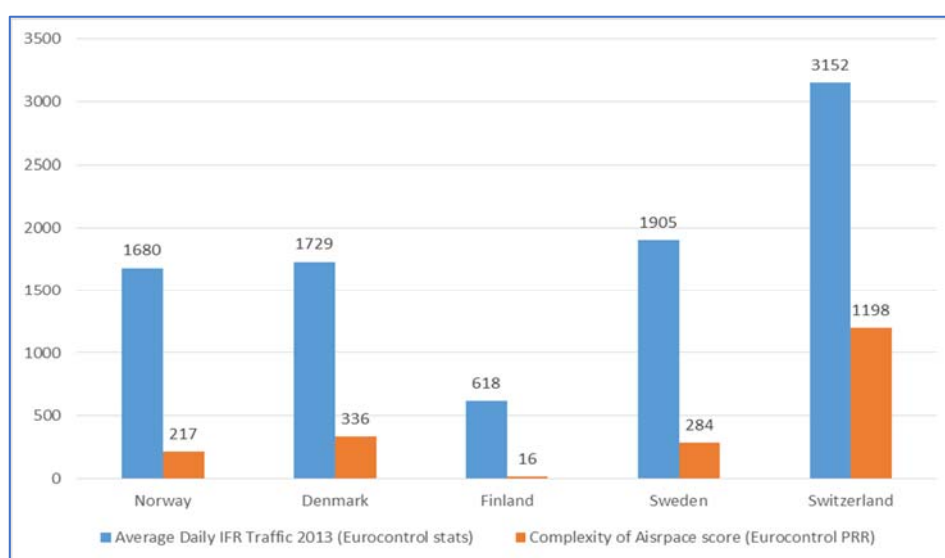


Figure 45 – Average number of daily IFR traffic combined with airspace complexity

Complexity in the present context is a function of traffic density and airspace structure. According to the EUROCONTROL Performance Review Report (2013), Switzerland and the UK have a significantly higher complexity score than the other ANSPs.

Based on the assumption that a mature organisation with a functioning SMS requires less oversight, Figure 46 compares the Effectiveness of Safety Management, EoSM, scores of the national ANSPs and CAAs (though the State level indicator) in the selected countries.

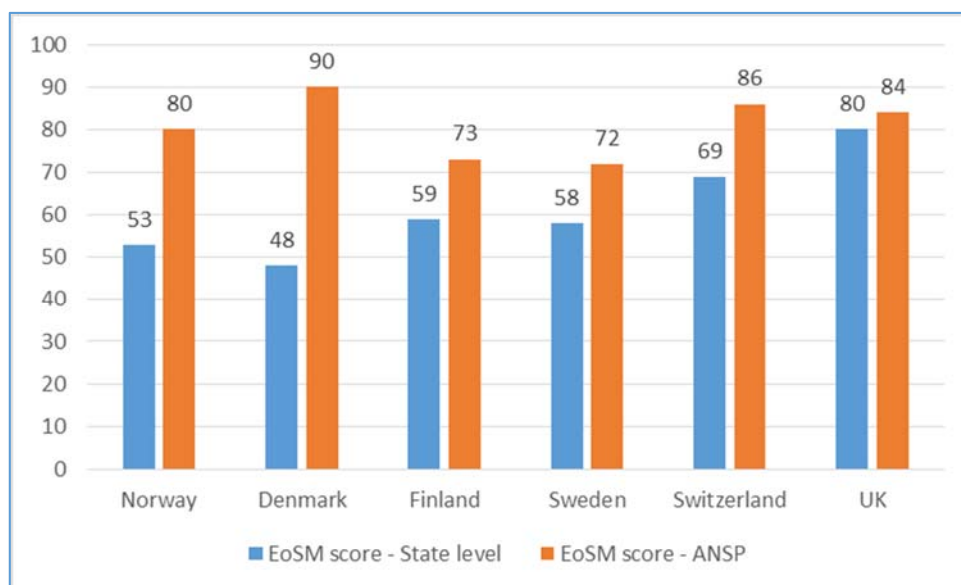


Figure 46 – Effectiveness of Safety Management scores (EoS) 2013²³

The Effectiveness of Safety Management (EoS) SPI measures, at State level, the capability of States to manage the State Safety Programme (SSP) and, at a service provision level, the service provider's capability to manage an effective Safety Management System (SMS).

The starting point was the ICAO SSP and SMS framework while additional components and elements have been added to better reflect the European context. The EoS indicator is measured by calculating scores based on the verified responses to questionnaires completed respectively by the State/competent authorities (normally the NSA) and the ANSPs. This is done in accordance with Acceptable Means of Compliance (AMC) and Guidance Material (GM) for the Implementation and Measurement of Safety Key Performance Indicators²⁴.

, showing the traffic numbers and the airspace complexity, these figures provide an overview of the volume and the quality of ANSP activities as an indicator for CAA related efforts in this domain.

At State level, the EoS comparison ranges between a group consisting of all the Nordic countries with a score of between 50 and 60, followed by Switzerland with 69 up to the UK with a score of 80.

The two countries with the highest amount of traffic and airspace complexity (Switzerland, UK) also record high scores in respect of the EoS indicator, both at State and ANSP level.

²³ Source: PRB Annual Monitoring Report 2013 – Volume 1

²⁴ EASA Decision 2013/032/R of 10 February 2015

6.6. Aerodromes

The Aerodromes domain is defined by ICAO Annex 14 and related EU regulations, i.e. Commission Regulation 139/2014. A distinction of Annex 14 is the broad range of subjects it contains. It extends from the planning of airports and heliports to such details as switch-over times for secondary power supply; from civil engineering to illumination engineering; from provision of sophisticated rescue and firefighting equipment to simple requirements for keeping airports clear of birds. In the context of Luftfartstilsynet, this domain also includes the helicopter landing facilities in the off-shore segment.

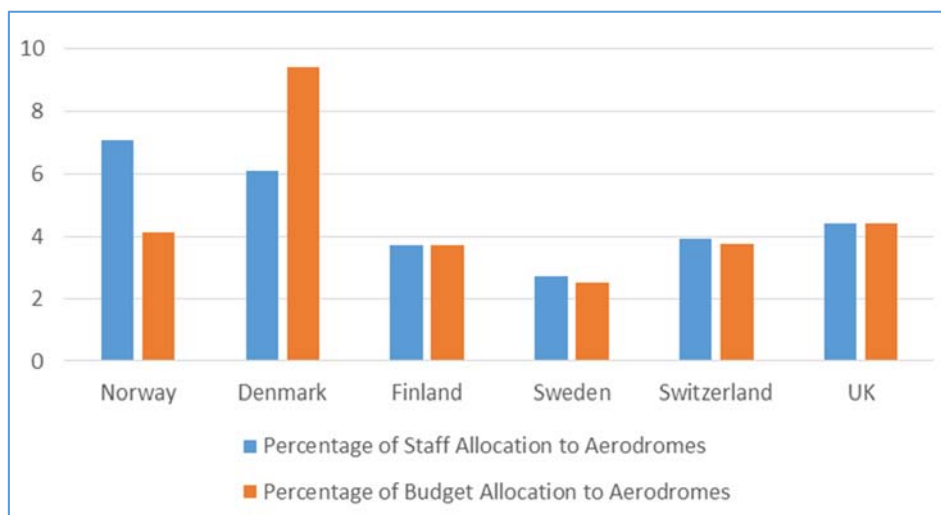


Figure 47 – Relative size of Aerodromes domain

Figure 47 shows the relative allocation of resources size to the Aerodrome domain within the selected CAAs. The resource allocation within the CAAs has to be seen in context with the number of airports. For the purpose of this analysis, the number of aerodromes regulated by EASA IR 139/14, as shown in Figure 48, has been used²⁵. However, ICAO location indicators²⁶ have been allocated to a total number of 192 aerodromes in Norway.

²⁵ The number of supervised aerodromes has been established based on the scope of application of the EASA Basic Regulation (216/2008) and of Commission Regulation 139/2014 (Implementing Regulation in the field of aerodromes). This scope comprises aerodromes which are open to public use, which serve commercial air transport, where operations using instrument approach or departure procedures are provided, and which : (a) have a paved runway of 800 metres or above; or (b) exclusively serve helicopters.

²⁶ ICAO Doc 7910 – Location Indicators

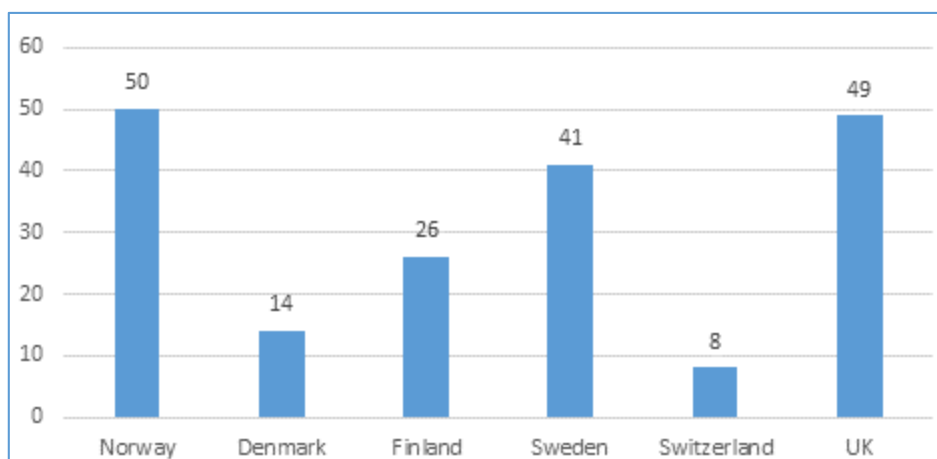


Figure 48 – Number of aerodromes regulated by EASA IR 139/14

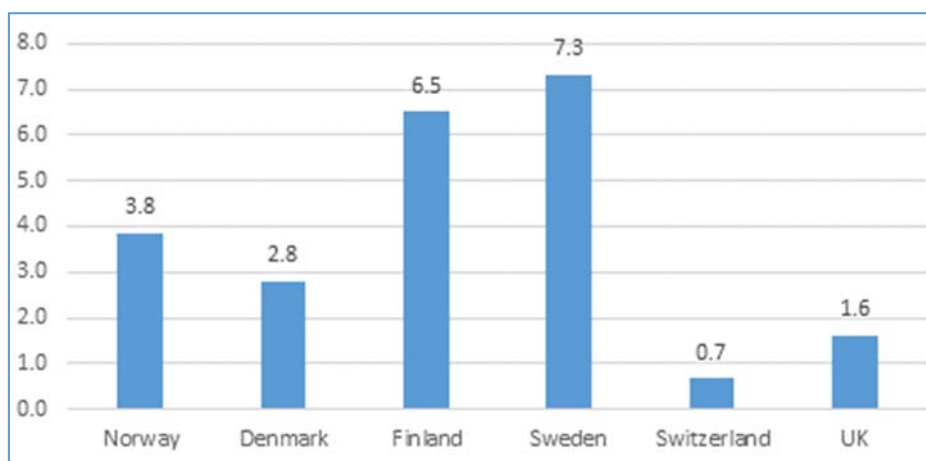


Figure 49 – Number of aerodromes supervised under EASA Regulation IR 139/14 per domain FTE

Figure 49 shows the average number of EASA regulated aerodromes under supervision per domain FTE. The result shows a considerable difference between the benchmarked organisations, ranging from 0.7 in FOCA to 7.3 in Transportstyrelsen.

6.7. Aviation Security

The Aviation Security domain is defined by ICAO Annex 17 and related EU regulations, i.e. EU Regulation 965/2012. Annex 17 is primarily concerned with administrative and co-ordination aspects, as well as with technical measures for the protection of the security of international air transport, requiring each Contracting State to establish its own civil aviation security programme with such additional security measures as may be proposed by other appropriate bodies.

Annex 17 also seeks to co-ordinate the activities of those involved in security programmes. It is recognised that airline operators themselves have a primary responsibility for protecting their passengers, assets and revenues, and therefore States must ensure that the carriers develop and implement effective complementary security programmes compatible with those of the airports out of which they operate.

Figure 50 shows the relative allocation of resources size to the Aviation Security domain within the selected CAAs.

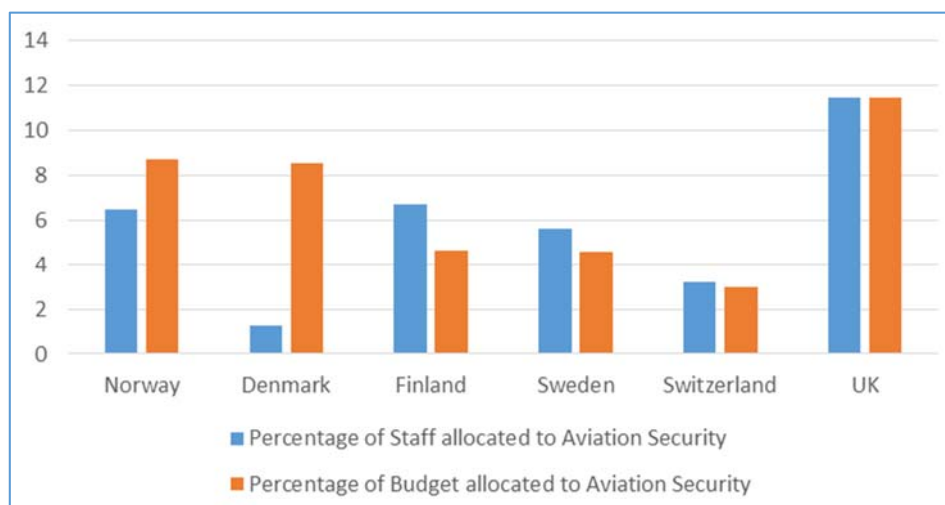


Figure 50 – Relative size of the Aviation Security domain

According to the EU regulatory Framework applicable to Aviation Security, the member states have the following obligations:

- ➔ Designate a single authority, which is responsible for coordinating, monitoring and enforcing the implementation of aviation security laws and regulations.
- ➔ Draw up and implement a "national civil aviation security programme" which sets the roles and obligations of all operators concerned with the implementation of aviation security laws and regulation.
- ➔ Set up and implement a "national quality control programme" to determine the level of compliance with aviation security laws and regulations by the operators and to provide measures to correct deficiencies. Such programmes shall notably establish the specifications with regard to aviation security audits and inspections, including their frequency.
- ➔ Impose penalties in case of infringements, through the above authority responsible for aviation security.
- ➔ Cooperate by any means with and assist the European Commission when it conducts inspections to monitor compliance with EU rules on aviation security. They shall notably ensure that the notification of an inspection is kept confidential and make "qualified auditors" available to participate in inspections by the Commission.

The EU framework does not explicitly state that these tasks must be taken over by the National Civil Aviation Authority; hence, these tasks can be – partially or fully – executed by another suitable authority.

This, combined with the acknowledgement that the threat profile to the civil aviation can vary from country to country makes it difficult to compare these respective departments.

6.8. *Safety Data Analysis*

The Safety Data Analysis domain is defined by ICAO Annex 19 – a ‘new’ Annex to the ICAO Convention developed in response to a recommendation from the 2010 ICAO High Level Safety Conference. The benefits of an additional annex, containing the overall standards and recommended practices with regard to Safety Management, are:

- It addresses safety risks proactively.
- It provides for management and support of strategic regulatory and infrastructure developments.
- It enforces the role of the Contracting States in managing safety at the State level, in coordination with service providers and operators.
- It stresses the concept of overall safety performance in all domains.

A section of Annex 19 describes the relevant components of a State Safety Program (SSP) and in particular looks at the Safety Data Collection, Analysis and Exchange and the Legal Guidance for the Protection of Safety Information from Safety Data Collection and processing systems.

In the context of this report, the Safety Data Analysis is seen as a pool of expertise benefiting all oversight activities – from a qualitative perspective. As this activity underpins risk based oversight philosophy, it is dealt with in Chapter 7, which analyses – in a qualitative way – some of the core oversight elements.

6.9. *Support Functions*

In the context of the present study, ‘support functions’ were defined as ‘overhead tasks necessary for the proper administration and management of the organisation’. As mentioned before, there are differences between the CAAs in the way resources are allocated. While some CAAs tend to include management or specific legal support within the scope of a department, another CAA might prefer to allocate these resources as support functions. This is particularly valid for the organisations that are using some resources across several departments. Especially the following functions were seen to be ‘support functions’:

- HR
- Finance
- Legal service
- IT
- Corporate Communication

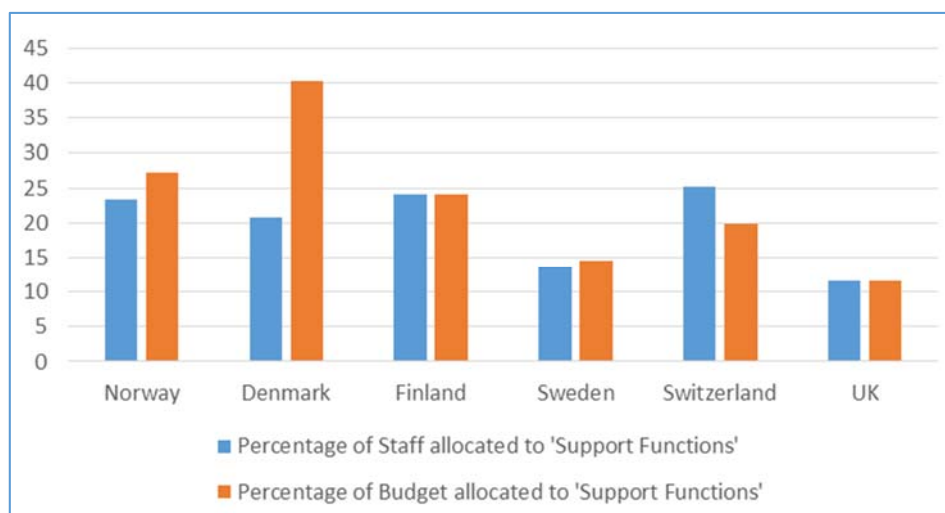


Figure 51 – Relative size of Support Functions

Figure 51 shows the relative allocation of resources to Support Functions within the selected CAAs.

6.10. Other domains

The “other items” category encompasses all the CAA tasks that could not be counted within the pre-defined categories (supervised aviation domains or CAA support functions). Depending on the examined CAA, this may include essential tasks such as “safety analysis” or “regulatory policy” when these items have not been reported as part of the specific domains.

As far as possible, we have aimed to minimise the number of tasks to be considered in the “other” category and have systematically reallocated certain items into other categories (e.g. we have allocated FTEs regarding aeromedical sector to the Aircrew Licensing domain, as this is the domain to which most of these tasks relate). This has been consistently applied in respect of all benchmarked organisations.

6.11. Comparative analysis – Luftfartstilsynet and other Nordic CAAs

Methodology and rationale

By way of conclusion to the conducted quantitative analysis, this section will scrutinise the performance of Luftfartstilsynet in comparison to the three CAAs having the most similar national context and operating environment: Trafikstyrelsen (Denmark), Trafi (Finland) and Transportstyrelsen (Sweden).

In effect, Trafikstyrelsen, Trafi and Transportstyrelsen are Nordic CAAs regulating national aviation industries of a broadly similar size as in Norway. Therefore, it was deemed appropriate to place a specific focus on the comparison of Luftfartstilsynet with these three organisations.

In the framework of this specific assessment, two key parameters are examined:

- Human resources (in terms of FTEs per year in 2013/2014) allocated by the CAAs to a specific domain as well as for all CAA functions taken together (reflecting CAA “inputs”);
- Regulated aviation industry (based on the latest available numbers of supervised entities or persons) in the examined domain and considering all domains (reflecting – indirectly – the volume of work and outputs delivered by the CAA).

The measured indicator is basically staff productivity. While we consider this a key gauge for evaluating efficiency, two caveats should be acknowledged:

- As specified above, outputs are examined indirectly, drawing on the number of supervised entities and persons – not based on the number of outputs over a given year (conducted audits, granted personnel licenses, issued certificates etc.). It would not have been possible to perform a fair comparison of CAAs based on the actual produced outputs due to numerous data quality and availability issues, which could have distorted the assessment. However, we are confident that the number of supervised entities and persons will reasonably reflect the workload of the CAAs, and thus constitute a sound parameter for the assessment.
- The staff productivity value may not be objective if a significant number of tasks are outsourced by the organisation (for example to a certified/qualified entity). In this case, productivity may appear artificially high as FTEs employed outside of the organisation can enable a higher output with a lower number of in-house staff. However, we are not aware that any of the examined CAAs would have made an extensive use of external resources, which would considerably affect comparability.

Results

For presenting the results of this numerical assessment in a concise and user-friendly manner, we have devised an assessment matrix showing the observed differentials (between the Luftfartstilsynet and each comparator), as regards the number of supervised entities/persons and the number of allocated FTEs.

For the purpose of this assessment, if the difference in the number of FTEs or supervised entities does not exceed $\pm 20\%$, the situation is deemed to be equivalent, i.e. within a reasonable margin. By contrast, a difference exceeding $\pm 50\%$ is regarded as significant. We also consider the intermediary scenario with a (less pronounced but notable) difference, i.e. between $\pm 20\%$ and $\pm 50\%$.

Based on the classification described above, five possible scenarios emerge – they are distinguished by the following colours:

- **Green area:** Luftfartstilsynet uses considerably fewer human resources (in terms of FTEs) than the comparator CAA when examined in conjunction with the size of the regulated industry. This result would clearly point to an efficient use of resources by Luftfartstilsynet.

- **Bright green area:** Either Luftfartstilsynet uses fewer human resources for an equivalent or larger regulated industry; or Luftfartstilsynet uses an equivalent amount of human resources but supervises a larger industry. This scenario would also suggest that Luftfartstilsynet has achieved a good level of efficiency.
- **Yellow area:** Luftfartstilsynet uses an equivalent amount of human resources and has an equivalent number of supervised entities or persons than the comparator. In this case, it is not possible to identify any difference in efficiency between Luftfartstilsynet and the comparator.
- **Orange area:** Either Luftfartstilsynet uses more human resources for an equivalent or smaller regulated industry; or Luftfartstilsynet uses an equivalent amount of human resources but has a smaller regulated industry. This result implies that there could be potential for a more efficient use of resources by Luftfartstilsynet.
- **Red area:** This scenario is the same as in the orange area, but the observed differentials are bigger. Either Luftfartstilsynet uses considerably more human resources than the comparator CAA, but has an equivalent or lower number of supervised entities or persons than the comparator; or Luftfartstilsynet uses an equivalent amount of human resources but has a considerably smaller regulated industry. This result would strongly point to the existence of an efficiency gap, and thus to the potential to improve efficiency.

Matrix 1 – Comparison with Trafikstyrelsen

Luftfartstilsynet compared to Trafikstyrelsen Denmark		Regulated industry				
		Considerably bigger ($X > 150\%$)	Bigger ($150\% > X > 120\%$)	Equivalent ($120\% > X > 80\%$)	Smaller ($80\% > x > 50\%$)	Considerably smaller ($50\% > X$)
Number of allocated FTEs	Considerably lower ($50\% > X$)					
	Smaller ($80\% > X > 50\%$)					
	Equivalent ($120\% > X > 80\%$)					
	Higher ($150\% > X > 120\%$)			Aircrew licensing		
	Considerably higher ($X > 150\%$)	Aerodromes	Air operations Support functions CAA (all functions)	Airworthiness ANS		

Figure 52 – Efficiency – Luftfartstilsynet compared to Trafikstyrelsen

Matrix 2 - Comparison with Trafi

Luftfartstilsynet compared to Trafi Finland		Regulated industry				
		Considerably bigger (X > 150%)	Bigger (150% > X > 120%)	Equivalent (120% > X > 80%)	Smaller (80% > x > 50%)	Considerably smaller (50% > X)
Number of allocated FTEs	Considerably lower (50% > X					
	Smaller (80% > x > 50%)					
	Equivalent (120% > X > 80%)		Air operations		Aircrew licensing	
	Higher (150% > X > 120%)					
	Considerably higher (X > 150%)	ANS Aerodromes	Airworthiness Support functions CAA (all functions)			

Figure 53 – Efficiency – Luftfartstilsynet compared to Trafi

Matrix 3 – Comparison with Transportstyrelsen

Luftfartstilsynet compared to Transportstyrelsen Sweden		Regulated industry				
		Considerably bigger (X > 150%)	Bigger (150% > X > 120%)	Equivalent (120% > X > 80%)	Smaller (80% > x > 50%)	Considerably smaller (50% > X)
Number of allocated FTEs	Considerably lower (50% > X					
	Smaller (80% > x > 50%)					
	Equivalent (120% > X > 80%)				Airworthiness ANS CAA (all functions)	Aircrew licensing
	Higher (150% > X > 120%)					
	Considerably higher (X > 150%)		Aerodromes		Air operations	

Figure 54 – Efficiency – Luftfartstilsynet compared to Transportstyrelsen

Interpretation and analysis of the results

The following observations and indicative conclusions can be drawn from this assessment:

- ➔ With regard to the volume of the regulated industry, the situation appears overall rather similar. Based on our calculation, Norway has a larger regulated industry on the whole than Finland and Denmark, with a marked sectorial difference as regards the aerodrome domain (number of aerodromes within the EASA regulatory scope). On the other hand, our model shows that Sweden has the largest aviation industry in the Nordic Region (Norway's aviation industry is estimated to be 35-40% smaller than the industry in Sweden).
- ➔ For the sake of clarity, it is necessary to specify that the following key elements have been taken into account for estimating the regulated industry size in each country (overall and respectively in each aviation domain): the number of AOCs under supervision, the number of approved continuing airworthiness organisations²⁷, the number of pilot licenses²⁸ under supervision, the number of certified ANSPs²⁹, the number of ATCO and FISO licenses under supervision and the number of aerodromes³⁰, and the number of aircraft in register³¹ (only taken into account for overall dimension). Many more elements could have been taken into consideration, but we believe this would not have changed significantly the big picture.
- ➔ Some differences in the number of supervised entities appear when examining the situation at a more sector-specific level. In particular, Luftfartstilsynet is supervising a substantially higher number of aerodromes than the CAAs of Denmark and Finland, and Luftfartstilsynet oversees a higher number of air operator certificates than the aforementioned two CAAs. In comparison with Sweden, the number of supervised entities and individuals is overall lower in Norway, with the exception of the aerodrome domain where the number of aerodromes subject to the EASA requirements is higher in Norway (50 aerodromes in Norway, 41 in Sweden).
- ➔ In terms of staffing, Luftfartstilsynet was found to have an equivalent or higher number of FTEs than the CAAs of Denmark and Finland in all of the examined domains. When considering the whole CAA organisation, the difference in employed human resources (FTEs) amounts to around +70% in comparison to Trafi (Finland) and to approximately

²⁷ Includes CAMOs, AMOs part 145, AMOs part F, and MTOs part 147.

²⁸ Includes PPL, CPL and ATPL.

²⁹ Includes ATS & AFIS, CNS, MET and AIS providers

³⁰ Includes aerodromes in the scope of EASA Basic Regulation 216/2008 and of Commission Regulation 139/2014.

³¹ Includes the aeroplanes and helicopters in register having an EASA certificate of airworthiness OR meeting the criteria of Annex II to EU Reg. 216/2008.

+120% when comparing to Trafikstyrelsen (Denmark). In comparison to Transportstyrelsen (Sweden), Luftfartstilsynet has a slightly lower number of FTEs (difference amounting to approximately 10%).

- ➔ When looking at the situation per domain taking account of both parameters (industry size and CAA staffing), it is possible to note that some differences in the number of FTEs per domain, in particular between Luftfartstilsynet and the CAAs of Finland and Denmark, are clearly related to a higher number of supervised entities (e.g. in respect of the aerodrome or air operations domain).
- ➔ Based on the matrixes above, the aviation domains in which Luftfartstilsynet could potentially achieve the most efficiency gains are “Airworthiness” and “Aircrew Licensing”. In these fields, the labour-intensity of Luftfartstilsynet appears consistently higher than in the compared organisations – these are also the domains in which IT applications could provide a high added value in terms of efficiency, as highlighted in the following chapter.
- ➔ As regards the “efficiency gaps” identified within the technical domains (e.g. Airworthiness and Aircrew Licensing), there are possible statistical factors (e.g. how FTEs for support functions within technical departments are accounted for and reported) that can affect the number of FTEs reported for a specific technical department. Therefore, it is not appropriate to quantify any identified “efficiency gaps” in this respect, but rather to point out, through the attached matrixes, the areas where there would seem to be most room for improvement.
- ➔ A more robust conclusion can be drawn by comparing the total CAA human resources (FTEs) in the light of the overall industry volume at national level. In this case, it is possible to rule out possible statistical biases related to the breakdown of CAA FTEs per specific domain, as all FTEs are aggregated.
- ➔ Also from this overall perspective, Luftfartstilsynet appears to have proportionally more FTEs than the two comparators. The estimated differential (when adjusted to industry size) is of approximately +52% compared to Trafikstyrelsen, +29% compared to Trafi and +20% compared to Transportstyrelsen.³²
- ➔ When considering the aforementioned result, it is necessary to bear in mind that the CAAs of Denmark, Finland and Sweden do not work under the same organisational model as

³² Please note that these figures (together with the matrixes) have been revised for the final version of this report due to:

- the inclusion of the number of approved continuing airworthiness organisations as part of the industry size calculation;
- the consideration of the number of (national) FISO licenses together with the number of ATCO licenses;
- the determination of the number of aerodromes based on the scope of the EASA regulation.

The resulting finding remains unchanged, i.e. there is a notable differential with each of the examined organisations.

Luftfartstilsynet: they are part of wider national Transport Agencies, where support functions are shared with oversight departments responsible for oversight of other transport modes.

- Another relevant factor that needs to be considered is the work Luftfartstilsynet is required to carry out in respect of rulemaking, namely for the purpose of developing legal acts transposing the EU aviation acquis into national law, in application of the EEA Agreement. As Finland, Denmark and Sweden are EU Member States, EU regulations are directly applicable, and thus the CAAs do not need to work on the legislative transposition.
- Other factors such as the complexity of the supervised operational environment (airspace, airport operations, number of line station in the field of continuing airworthiness etc.), the average risk level of overseen entities (e.g. commercial aviation vs general aviation) or “additional” CAA duties (e.g responsibility for air passenger rights enforcement as regards both Trafikstyrelsen and Trafi) undoubtedly also affect the CAA staffing levels, but cannot be directly appraised here due to the difficulty of quantifying these factors. Similarly, we have not included the “aviation security” domain as part of this specific assessment due to incomplete data.

7. Qualitative analysis

7.1. Application of Risk Based Oversight as a methodology

As briefly touched upon in section 3.4, Risk Based Oversight (RBO) in the present context is defined as *"a way of performing oversight, where planning is driven by the risk profile and execution, besides ensuring compliance, focuses on the management of operational risks"*.

Based on the hypothesis that an application of RBO allows for more efficient oversight (see also Section 3.4), the goal of this evaluation among the benchmarking authorities was to identify processes and RBO elements that can contribute to improving oversight processes.

General

Risk-based oversight has to be considered in contrast with the traditional "compliance-based oversight" methodology, where the emphasis is placed on the verification of conformity with the applicable regulatory requirements, and which typically relies on linear, repetitive audits of all aviation organisations.

RBO or Performance based oversight (PBO) and the underlying principle of allocating CAA resources onto areas, where they are needed most, has existed among the benchmarked CAAs in some form in the past. This resource allocation based on a risk picture, however, was typically not performed in a systematic way and came under different names and labels.

As of today, all of the assessed organisations are applying some form of RBO processes or elements thereof in their oversight. The application of RBO is strongly advocated by EASA and reflected in the EU aviation regulations. However, the process of implementing RBO is still ongoing, and the challenge for CAAs is to achieve a smooth and effective transformation process.

Norway

Luftfartstilsynet does not have a corporate wide RBO programme, but RBO processes are applied within the different departments. One of these programmes, called ACAM – Aircraft Continuous Airworthiness Monitoring, applies a risk based approach to obtain a risk picture about the different segments (for example 'Helicopter', 'fixed wing' etc) and is considered by EASA to be 'best practice'. This RBO process is supported with occurrence reporting monitoring and the analysis of financial 'due diligence' of selected organisations.

Denmark

As of today, there are pieces and elements of RBO applied, but not yet in a thorough systematic corporate wide way.

Trafikstyrelsen is working on a more RBO based method that will be based on an assessment of risks in the system and an allocation of resources according to these risks. High-risk operators will, however, still be treated with a 'compliance approach' to oversight.

One of the identified main enablers in relation to the rollout of RBO is the development of a methodology to assess and classify supervised aviation organisations based on the risk associated with their operations. Once this methodology as well as the related risk indicators are established, Trafikstyrelsen will seek to ensure, as a strategic aim, that its inspectors and management continuously consider the identified risk profiles in determining the scope and the frequency of audits/inspections.

Training activities are also planned in this respect in order to ensure that inspectors have the related knowledge and apply a uniform approach to RBO.

Sweden

RBO is already applied by Transportstyrelsen in many aviation domains (e.g. airports) and is reflected in the State Safety Programme.

The implementation rate (in the fourth quarter of 2014) was estimated at roughly 60-70%. The RBO application is still to be developed further in several aviation domains, e.g. helicopters operations. Indicators have been defined for the risk profiling and assessment of supervised organisations.

Transportstyrelsen has implemented a specific one-year project for supporting the initial implementation of risk-based oversight within the organisation.

Finland

Trafi is about to implement a corporate-wide RBO program, which is based on a systematic risk assessment and classifications of the overseen organisations. With regard to aviation oversight, it is due to be operational in 2015, and full implementation is foreseen in 2016.

RBO is seen as a major paradigm change for Trafi, also as regards its interaction with overseen entities. The authority will place an increasing emphasis on verifying that the supervised entities have proper, well-functioning safety and quality management systems. This entails that the supervised entities themselves will have to take more responsibility to monitor and ensure their own safety and quality (using their safety and quality management systems). Hence, Trafi considers RBO also in the light of “shared risks” between the supervisory body and supervised entities.

Trafi has taken advantage of the synergies between the different transport modes (for example, rail and aviation sectors) in the development of RBO. For instance, common basic principles are applied for defining the risk profiles of organisations. The used risk assessment methodology is composite, drawing both on an event-based programme (based on collected safety occurrence reports and statistics, including probability assessment) as well as organisational factors related to the implementation of safety management systems. Organisations are ranked on the one hand through the evaluation of their performance/capability in terms of safety, on the other hand considering their perceived motivation/commitment to deliver services safely.

Trafi's technical staff has already received some specific training in risk-based oversight. For example, an internal workshop was organised recently for aviation staff.

Switzerland

RBO has been partially implemented in FOCA, and further development is ongoing. FOCA applies a rather subtle transfer to RBO instead of a large corporate-wide program. Accordingly, there is no fixed deadline for finalising the transformation process: the shift to RBO is seen as part of a continuous improvement process to fine-tune and optimize FOCA processes; this is done systematically as a part of the FOCA safety management system.

A more efficient use of resources is the main goal, and the selected approach is based on a thorough understanding of the organisation from all aspects (financial, organisational, and legal) and an understanding of the safety management system. Such an analysis is referred to as 'organisational risk profiling' and has the goal to fully understand the 'safety health' of an overseen organisation.

United Kingdom

A full transformation to RBO is one strategic objective of the CAA UK. The UK industry has informed the CAA UK that it believes RBO (and with that, risk based regulations) should make the CAA UK more proportionate and targeted, lead to a greater degree of commercial awareness and make it more transparent about how money is spent. It is the goal of the CAA UK to have the transformation to PBR completed by April 2016.

As of today there are the following elements already in place:

- ➔ A corporate wide training program to educate the staff. An internal training program has been rolled out to over 170 CAA UK personnel in the past year and CAA UK has so far established 20 oversight teams for regulated entities and safety programmes and projects. In addition, approximately 150 Phase 1 Safety Management System (SMS) assessments on UK Air Operator Certificate holders that have provided assurance that the key elements of SMS are in place, have been conducted.
- ➔ Under the Enhancing Safety Programme (ESP), the CAA UK is developing a risk and performance based approach to regulation – known as Performance Based Regulation (PBR). It goes beyond ensuring compliance with rules and aims to identify the highest aviation risks to the UK passenger and general public across the total aviation system, and to ensure that the management of these risks is effective. This is done by assessing and prioritising the risks, hence the CAA resources can be targeted in the most important areas and determine the safety outcomes that are most important to pursue. A key element of PBR is the formation of multi-disciplinary teams with tools and processes to form a coherent CAA UK view of the total aviation risk picture and to assess the safety performance of the various actors relating to that picture.

Financial oversight on the overseen companies is not done in a systematic way.

Key findings

- All the examined organisations are in a shift towards a more widespread application of RBO, driven both by regulatory requirements and the objective of making an optimal use of resources.
- The level of maturity in terms of RBO application varies to a certain extent between the examined organisations: some organisations are already initiating the implementation of RBO in practice, while others are still in the development phase.
- However, there is a broad, common understanding throughout the examined organisations of the added value of RBO (& performance based oversight – PBO).
- As regards the transitional arrangements, there are no universal ‘silver bullet’ processes that can be seen as an ideal match for all authorities – local circumstances and industry risk profiles will determine the modalities and timeline of the transition towards RBO.
- RBO is not expected to replace compliance-based oversight altogether. Accordingly, there is no short or medium efficiency gain (e.g. reduced head count, lower oversight costs) expected from a full transition to RBO.
- Nonetheless, RBO is expected to deliver an increase in the output quality, i.e. a better ‘effectiveness’ of oversight. This is expected to be achieved through a better, targeted use of resources.
- At the same time, aviation operators having a low risk profile will undoubtedly benefit from a lower administrative burden, which will allow them to save valuable time and costs.
- To obtain an appropriate risk picture in connection with selected industry segments or overseen organisations, information from different CAA domains (financial information, legal information, occurrence reporting, airworthiness etc.) should be utilised.
- Sophisticated, comprehensive data collection and analysis (especially regarding safety aspects) is a key prerequisite for properly implementing RBO. For this purpose, CAAs will have to ensure that their staff is adequately trained in the RBO methodology, and that they have appropriate IT software at their disposal.

7.2. Use of information technology in the safety oversight processes

The use of Information Technology (IT) has delivered substantial efficiency gains for many industries and businesses. In the case of public administrations (such as CAAs), IT potentially offers a similar range of opportunities for improving service provision to and communication with customers. Thus, “IT usage” was selected as one of the key components to be scrutinised from an efficiency perspective in the framework of this benchmarking study.

General

The use of IT by public administrations has been widely acknowledged to improve the delivery of public services, and specific policies have consequently been designed to foster the widespread emergence of “E-government”, both at the level of the EU and of national governments. E-government policies and solutions have to be considered both from an internal and external perspective.

The internal dimension of E-government reflects the potential to improve the internal processes of a public sector organisation. IT solutions may allow the automatisisation of routine tasks and processes previously done manually by employees. This can deliver benefits not only in terms of efficiency, but also of effectiveness, as the electronic processing and transmission of information may reduce processing times and improve the interaction between administrative units.

Internally, Luftfartstilsynet has, like the benchmarked CAAs, implemented IT applications in accordance with government policies in the areas of HR management, budgeting and accounting and purchasing and invoicing. Such implementation is bringing relief in the resource demand for support functions, but as this study is focussing on the safety oversight functions, this area has not been analysed by Integra.

The external dimension of E-government, on the other hand, highlights the benefits of technology in the delivery of services to customers. The development of ever more advanced and sophisticated websites for public administrations enables a more effective and rapid interaction with and dissemination of information to costumers/stakeholders.

In this context, public service provision can be facilitated through online services and applications integrated as part of the websites of public organisations. By allowing customers to undertake certain administrative steps (e.g. filling and submitting applications, uploading documents etc.) directly online, the administration improves its own efficiency. At the same time, it also delivers benefit to customers, who are able to use the service 24/7 without having to deliver hard copies of documents or be physically present at the public administration’s premises (or even in the country concerned). Largely, the interaction of the administration with its customers can thus be improved and the administrative burden reduced, and electronic and automatic sharing of the data provided to the administration between the organisational units involved in the subsequent casework can even reduce the manual workload further.

Norway

Although a few forms and templates are available online, all applications have to be submitted by mail.

At present, all departments of Luftfartstilsynet are using the IT tool Empic, which has been developed specifically for use by CAAs. However, the application is used at different levels of maturity by each department, and data exchange between departments via Empic is available only to a limited extend. Luftfartstilsynet is cooperating with Transportstyrelsen and Trafi in order to share experiences and develop common proposals for system modifications, the aim being to achieve optimal benefit from Empic.

During interviews with heads of departments, they all expressed a need for increased use of common applications, and Luftfartstilsynet has launched the establishment of a four-years IT development programme. However, the programme is still in the design phase, and doubt has been expressed whether the budget will allow implementation of such an ambitious programme.

Denmark

Online forms and templates are available online, but applications have to be submitted by mail and not directly through the website.

Trafikstyrelsen is not particularly keen to develop shared databases and tools with customers, taking account of their role as a supervisory body. However, there would be an interest in elaborating further the possibilities for customers to input data directly into the Trafikstyrelsen's systems.

Sweden

Transportstyrelsen has the ambition to develop further its IT applications, including for the purpose of facilitating the interaction with customers.

The EMPIC software is in use for the internal management and planning of Transportstyrelsen's tasks. The website offers the possibility for customers to access and print a large number of forms. Some direct online transmission of information from customers to Transportstyrelsen is also possible as regards specific application processes.

Envisaged IT improvements include allowing users to have personal profiles on a secure website and communication and information exchange with Transportstyrelsen. A common online platform with other transport modes could be a cost-efficient solution for this purpose. However, Transportstyrelsen has pointed out that some existing legal requirements (such as the obligation to issue licenses on paper) may hamper the development of IT solutions.

Generally speaking, Transportstyrelsen has stressed that the experience with IT development has been mixed. It has offered new opportunities but, on the other hand, it has been difficult so far to demonstrate the short and medium term efficiency benefits of IT through cost-benefit analyses. Accordingly, there has not been any recorded substantial reduction of Transportstyrelsen's workload so far because of IT deployment.

Finland

Trafi as a whole has a large number (107) of IT programmes. IT management and development were clearly boosted by the merger of transport authorities, which resulted in the sharing of IT resources and expertise.

IT is clearly seen to deliver benefits in terms of efficiency and better data availability, and Trafi sees potential for an even wider use of IT applications available for customers. In the aviation domain, the number of interactive IT applications was still limited to certain specific fields in 2014.

All application forms for certificates and license could already be found on Trafi's website, and some forms could also be filled out and submitted directly online to Trafi.

With Finavia (the air navigation service provider), Trafi has certain IT based ad hoc arrangements in place in pace with a view to facilitating interaction, e.g. Trafi personnel are able to access certain internal documents (safety management system etc.) directly in Finavia's system.

For internal purposes, Trafi uses the Empic system (customised to local conditions) to manage its aviation related activities. IT use in the aviation domain is also considerably driven by developments at EU level, one example being the ECCAIRS database used to store and share safety occurrence reports. IT is also used for communication (reporting, sharing of information) with EASA and ICAO (e.g. in the framework of the USOAP³³ Continuous Monitoring Approach).

Switzerland

FOCA's website mostly serves the purpose of disseminating information to customers, but does not currently cater for the direct filing of applications online. The basic application forms can, however, be downloaded online. FOCA has no concrete plans for the moment to increase the number of IT-based tools available to customers, but this is seen as a likely trend over the next few years.

As regards direct interaction with supervised entities, there is no overall policy but rather bilateral arrangements with various supervised organisations, allowing electronic exchange and sharing of data. On the other hand, the internal data sharing and exchange of information has been very much improved because of IT use.

United Kingdom

The CAA UK is gradually introducing new on-line forms solutions, which will enable its customers to complete and submit all sorts of applications electronically. As part of this change they will also be introducing the option to pay on-line for the applications.

In addition to the standard internet site search capability, the UK CAA also provides a number of applications to enable the public to search databases of publically available information. These databases include amongst others:

- ➔ Aircraft Register (G-INFO) Database
- ➔ Airworthiness Approval Note (AAN) Database
- ➔ Aircraft Equipment Approvals (AEARS) Database

Accidents and incidents are can be reported online (and confidentially) through various forms available on the website.

³³ Universal Safety Oversight Audit Programme

Besides that the UK CAA is using a wide range of different software solutions. Usage of more sophisticated IT applications is seen as an enabler for more efficient processing of data and delivery of services.

Key findings³⁴

- ➔ There are diverging views and experiences across the examined organisations regarding the use of IT – nonetheless, all organisations consider the development of IT applications as a necessary step to modernise their processes and improve customer experience.
- ➔ As regards the internal dimension of IT use, all organisations were found to be continuously developing their IT systems and processes with a view to supporting their oversight activities. For example, the intensive use of IT for safety analysis was identified as one of the key enablers for risk based oversight, which in turn bolsters the effectiveness of oversight.
- ➔ As regards the external dimension of IT use, the utility of proposing interactive online IT applications to customers was recognised, but the level of implementation varied considerably. Some CAAs are engaged in the active development of these IT solutions, while other have taken a more reserved stance.
- ➔ The development of IT solutions will always require a notable upfront investment (in terms of resources) from the CAA, whereas the benefits will be only gradually reaped once the solutions are implemented. However, the replacement of unproductive paper processes by IT solutions is always bound to be positive for both the CAA and its users in the medium and long term, even if a short-term financial cost may be associated.
- ➔ Some of the examined CAAs have introduced applications for the online filling and submission of application forms. This is certainly one of the IT developments offering the most potential from the point of view of both CAAs and users. For users, it brings more flexibility, better accessibility and less bureaucracy; for CAAs, it reduces unproductive paperwork related to the processing of data and thus saves resources.
- ➔ One interesting online feature (envisaged by at least one of the examined CAAs) is to allow customers to have permanent user profiles in the CAA system. Thus, basic information regarding the user concerned does not need to be resubmitted with each new application, which further reduces the administrative burden. Moreover, the IT platform would offer a convenient interface for the continuous dialogue between the CAA and the user.
- ➔ CAAs can also seek to streamline their oversight processes through arrangements concerning the electronic sharing of data with the supervised entities. CAAs can establish

³⁴ Only the use of IT applications to support the safety oversight functions and their interactions with costumers/stakeholders has been considered in this study.

partnerships with supervised entities allowing them to access the internal user databases in order to review the documentation (manuals, reports etc.) relevant for the continuous oversight. This should be a win-win arrangement, allowing lighter and more flexible processes for both the CAAs and the supervised entities. However, data privacy and security aspects need to be carefully considered in this context.

7.3. *Safety data collection, analysis and dissemination*

The collection, analysis and dissemination of safety data is an essential part of CAA activities. This specific area was selected for scrutiny, because it is seen as a driver for the increased effectiveness of safety oversight. In addition, the objective was to identify possible best practices.

Overall, the responses received from all CAAs concerning safety data collection, analysis and dissemination were highly convergent. Therefore, we will outline in this section the general orientations and findings rather than describe the individual situations of individual CAAs, which are fundamentally similar.

General

Safety data collection, sharing and analysis has to be considered in the light of the safety assurance and promotion function of a CAA. The processes related to safety data collection and analysis are, by definition, continuous and iterative. Close cooperation with all the relevant actors at national level is required, including with the Aviation Accident and Incident Investigation Body (AAIB).

A variety of safety data sources are available, including accident investigation reports of the AAIB, occurrence reports received from the industry, ramp inspection reports from the Safety of Foreign Aircraft Programme (SAFA), reports from the conducted safety oversight audits and data transmitted by other CAAs or EASA. One single source cannot provide all the necessary information, and therefore a mix of all sources needs to be used.

Occurrence reports submitted by the aviation industry are undoubtedly one of the essential sources for safety analysis. The EU legislation, in particular Regulation 376/2014, sets out the overarching framework for the reporting of safety occurrences by aviation operators and personnel, in a protected environment based on "just culture". From a technical perspective, an important development has been the establishment of the European Central Repository, based on the ECCAIRS system (European Co-ordination Centre for Accident and Incident Reporting Systems) and managed by the Joint Research Centre of the European Commission.

Gathering safety data is only the first step in the chain of activities to achieve effective safety assurance and promotion – it needs to be followed by a sound analysis of the data and its transformation into meaningful "information". Finally, conclusions have to be drawn with a view to supporting safety, and these have to be taken into account when organising the CAA's activities. The dissemination of relevant information to stakeholders must also be guaranteed in order to foster their awareness of the identified safety risks and of the mitigation measures.

Key findings

- ➔ The general strategy and principles for safety data collection, sharing and analysis have to be spelled out through the State Safety Plan (SSP) to be established by each State. Without this document, there is a lack of strategic approach at national level concerning this important function.
- ➔ Specific national safety key performance indicators ought to be developed and monitored as part of the SSP.
- ➔ The successful implementation of risk-based oversight strongly relies on the ability of a CAA to effectively collect and systematically analyse all the available safety information. RBO is a data-driven process (both qualitative and quantitative) which has to be based on a sound methodology, and well-functioning processes and tools.
- ➔ The examined CAAs were found to have largely made use of IT solutions for their safety data collection processes. For example, the overwhelming majority (if not the totality) of safety occurrence reports are submitted electronically.
- ➔ There is, however, potential for an increased use of IT, notably regarding the automatic processing of safety data. Advanced software will be required for this purpose.
- ➔ Another interesting dimension is the collection of data from automated sources. For instance, in one of the examined countries, the automated data produced by the Flight Data Monitoring (FDM) systems (compulsory for all aircraft with a maximum take-off weight of 27,000 kg) is collected and analysed. This data is used together with occurrence reports for evaluating operational safety trends and for identifying and eliminating risk factors. Regular meetings between the data providing operators and the CAA are organised.
- ➔ In terms of safety data dissemination, the best practice is a proactive and transparent attitude. Some differences were identified as regards the amount and quality of published safety information by CAAs. Ideally, predefined safety indicators should be used – and the outcome of the continuous safety monitoring and analysis work should be regularly published. Information notes can be used to draw the attention of stakeholders to specific safety issues.
- ➔ By and large, safety analysis is a core CAA task, expected to require a considerable amount of resources (both human and financial) also in the future. Considering the transition towards risk based oversight, further investments in this field by all CAAs will certainly be warranted. It is also beneficial to consider in this respect the possible synergies between transport modes, both in terms of the methodology and IT solutions to be used.

7.4. Civil emergency response planning and preparedness

The purpose of benchmarking the CAAs on application of procedures for civil emergency response planning and preparedness was to identify, if different tasks and responsibilities bestowed upon the CAAs would have different effects with regard to resource allocation, and if the procedures were applied effectively and efficiently. Therefore, the CAAs were asked questions concerning the procedures applied in relation to situations like threats against national security, natural disasters such as fires and flooding, major search and rescue operations, precautions against infectious diseases etc.

The analysis has shown that although all the benchmarked CAAs are part of the national civil emergency plans, the resources allocated to the planning processes are insignificant for the benchmarking. In response to a civil emergency, all the CAAs will allocate the necessary resources to the tasks at hand on ad hoc basis, and it is not possible to analyse the effectiveness and efficiency in the processes applied.

Key finding

- ➔ The processes applied to civil emergency planning and preparedness are not relevant for the benchmarking.

7.5. Procedures for ensuring staff competency

As in many other branches of public administration, the CAA activities and services are highly labour-intensive, the main resource being qualified and competent employees. The complex regulatory and technical environment of aviation further amplifies the need for CAAs to continuously maintain and develop the competencies and expertise of their staff. This is also essential for the aviation industry, expecting a high quality of service from aviation authorities.

In the light of the above and considering the feedback received from consulted Norwegian industry representatives, staff competencies (in particular inspector competencies) was chosen as one of the key areas to be analysed in detail. Similarly as for the previous section, our findings are presented below in a consolidated manner.

General

CAAs have to ensure that their technical personnel are adequately trained, and to maintain the necessary competencies through continuous training, which should also cover legal and technical changes in the aviation industry. The skills and capabilities of the overhead staff (IT support staff being just one example) are similarly important and are to be fostered through appropriate training activities.

Because of EASA rulemaking, there is a trend towards the harmonisation of expected inspector qualifications at EU level. This seeks to ensure the proper and rigorous application of the safety oversight regime set out in the EU legislation. Requirements are often stringent due to the

technicality and complexity of the overseen aviation activities. At the same, there is growing demand for highly specialised aviation experts around the world, and CAAs are often competing with the private sector to recruit and retain these qualified professionals.

In addition, it has been a general assumption that expansion of EASA's competencies would lead to a centralisation of expertise in the area of rulemaking and oversight. Experiences by all the benchmarked national CAAs have indicated that this is not the case, and as mentioned above, the Norwegian stakeholders have expressed that they value the development and up-keeping of CAA expertise more than cost reductions.

Key findings

- ➔ All the examined CAAs emphasised the importance of staff competencies and training. There is a need to allocate adequate resources to this activity, also in the light of continuous changes in the regulatory requirements and in the technical environment.
- ➔ The examined CAAs confirmed the tendency towards the harmonisation of inspector competency requirements through EASA regulations. One consulted CAA explained that their internal procedures concerning inspector competency requirements are regularly updated, following new EASA regulations and decisions.
- ➔ In the context of the gradual shift towards risk based and performance based oversight, inspectors' capabilities to efficiently assess the safety management systems of overseen organisations will be fundamental. This needs to be taken into account in the recruitment and training plans of each CAA.
- ➔ CAAs are already making use of IT tools to manage their human resources, including as regards the management of continuous training activities. An observed good practice is the use of an IT tool where the competency profiles and training plans of each CAA staff member are monitored. This enables not only a real-time tracking of training activities, but also an easier identification and resolution of possible shortcomings in terms of training.
- ➔ One of the consulted CAAs expressly highlighted the importance of training for developing and continuously upholding a uniform, effective safety culture within the organisation.
- ➔ Enhanced cooperation between CAAs in respect of oversight activities could be a possible response to the need for highly qualified staff in various aviation domains. This potential was found to be still largely untapped by the examined CAAs.
- ➔ However, the "pooling of expertise" would be a particularly interesting solution for countries having small- or medium-sized national aviation industries. It would allow a more flexible and efficient use of CAA resources, while ensuring that specialised knowledge would always be available in the established pool of experts. In the ANS domain, the FABs could be a possible platform for developing this concept. A similar approach for the pooling of expertise is also being promoted at EASA level.

- ➔ Another option for addressing the growing need for expertise is to make use of “qualified entities” – this amount to externalising the conduct of certain certification or continuous oversight tasks to a specialised and appropriately accredited organisation. However, the CAA remains ultimately responsible for the performed activities as well as for the issuance of certificates and licenses. None of the examined CAAs had made an extensive use of qualified entities so far, but many of them regarded this as a likely scenario in the future, considering strained resources and the need for more specific expertise.

8. Conclusions

General cost-efficiency and labour intensity

Overall, Luftfartstilsynet is competitive and in line with comparable European civil aviation authorities (CAA) in terms of cost-efficiency.

In line with the 2010 OECD report, assessing public sector Value for Money return, the present data indicate, however, that Luftfartstilsynet is operating comparatively labour-intensively. This is particularly valid for the oversight domains “Aircrew Licensing” and “Airworthiness”.

Sharing support functions

Experience from other CAAs shows that sharing certain support functions with other regulatory bodies can yield efficiency gains and reductions in the head count by up to 15%. Merged functions typically include the procurement and maintenance of IT infrastructure and systems, dedicated HR functions connected to the administration of an organisation or the base training of staff. Such a merger does not necessarily imply a co-location of regulatory authorities.

Scale effects from larger markets

The data provided indicates that in some more repetitive and administrative processes such as “Airworthiness” or “Aircrew Licensing”, organisations operating a larger market are able to achieve ‘scale effects’ and execute these core oversight processes more efficiently.

Impact of EASA and technological developments

In contrast to a wide held assumption, EASA activities have not reduced, but have rather tended to increase, the workload of the national CAAs. At the same time, EU regulations and the emerging of new technologies have established new tasks and competency requirements for national CAAs which, especially for smaller States such as Norway, can prove challenging due to requirements of having qualified experts in-house, a smaller industry to serve, etc. – an issue that was highlighted by the Norwegian stakeholders during consultations.

IT application

The development of IT solutions is key to improving Luftfartstilsynet's productivity. For example, there is still untapped potential regarding online application forms or the electronic sharing of data with overseen entities. The replacement of unproductive paper processes by IT solutions is always bound to be positive for both the CAA and its users in the medium and long term, even if a short-term financial cost may be associated. It should be noted, however, that reduction of resources through increased usage of IT applications should not result in a reduction of technical experts or their competencies.

Procedures for RBO

The qualitative data collected for this report indicates that the roll-out of Risk Based Oversight (RBO) does not improve the efficiency of regulatory oversight, but rather improves its quality and effectiveness, as it allows the CAA to make a better, more targeted use of existing resources.

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Appendix II – List of Illustrations

Figure 1 – Theoretical framework and components of public service performance	15
Figure 2 – Results of the ICAO USOAP audits of the selected CAAs	18
Figure 3 – Key steps and milestones	21
Figure 4 – List of consultative activities	23
Figure 5 – Organisation of Luftfartstilsynet	29
Figure 6 – Distribution of financial resources, Luftfartstilsynet	29
Figure 7 – Distribution of staff resources, Luftfartstilsynet	30
Figure 8 – Organisation of Trafikstyrelsen	33
Figure 9 – Distribution of financial resources, Trafikstyrelsen	34
Figure 10 – Distribution of staff resources, Trafikstyrelsen	34
Figure 11 – Organisation of Trafi, October 2014	36
Figure 12 – Distribution of financial resources, Trafi	37
Figure 13 – Distribution of staff resources, Trafi	37
Figure 14 – Organisation of Transportstyrelsen	39
Figure 15 – Distribution of financial resources, Transportstyrelsen	40
Figure 16 – Distribution of staff resources, Transportstyrelsen	40
Figure 17 – Organisation of FOCA	43
Figure 18 – Distribution of financial resources, FOCA	43
Figure 19 – Distribution of staff resources, FOCA	44
Figure 20 – Organisation of CAA UK	45
Figure 21 – Distribution of staff resources, CAA UK	47
Figure 22 – CAA roles - overview	48
Figure 23 – CAA resources, 2013	49
Figure 24 – Total expenditure and state funding (in EUR)	50
Figure 25 – Price Level Index (2013) – Source: Eurostat	51
Figure 26 – Total expenditure (in EUR) with adjusted cost index	52
Figure 27 – CAA employees per million inhabitants	52
Figure 28 – Number of aircraft on register per CAA FTE	53
Figure 29 – Number of pilot licenses under supervision	54

Figure 30 – CAA domain hour per license under supervision	55
Figure 31 – Number of pilot licenses per domain FTE	56
Figure 32 – Relative size of Licensing Departments	56
Figure 33 – Number of FTEs allocated to Aircrew Licensing	57
Figure 34 – Number of Air Operations FTEs and AOC Holders under supervision	58
Figure 35 – Number of AOC Holders under supervision per domain FTE	58
Figure 36 – Expenditure per AOC Holder	59
Figure 37 – Relative size of Airworthiness domains.....	60
Figure 38 – Number of approved organisations and aircraft on register per domain FTE	61
Figure 39 – Costs per aircraft on register.....	62
Figure 40 – Resource allocation to ANS domain.....	62
Figure 41 – Number of ANSPs under supervision	63
Figure 42 – Number of certified ANSP organisations per domain FTE	64
Figure 43 – Number of certified ATSPs per domain FTE	65
Figure 44 – Number of ATCO and FISO licenses per domain FTE	65
Figure 45 – Average number of daily IFR traffic combined with airspace complexity	66
Figure 46 – Effectiveness of Safety Management scores (EoSM) 2013.....	67
Figure 47 – Relative size of Aerodromes domain	68
Figure 48 – Number of aerodromes regulated by EASA IR 139/14	69
Figure 49 – Number of aerodromes supervised under EASA Regulation IR 139/14 per domain FTE.....	69
Figure 50 – Relative size of the Aviation Security domain	70
Figure 51 – Relative size of Support Functions	72
Figure 52 – Efficiency – Luftfartstilsynet compared to Trafikstyrelsen	74
Figure 53 – Efficiency – Luftfartstilsynet compared to Trafi	75
Figure 54 – Efficiency – Luftfartstilsynet compared to Transportstyrelsen	75

Appendix III – The Questionnaire

BENCHMARKING STUDY

QUESTIONNAIRE TO PARTICIPATING CIVIL AVIATION AUTHORITIES

1. Introduction

This document contains the questionnaire for all participating organisations in the present benchmarking study which has the twofold aim of a) comparing the cost-efficiency of the oversight functions and of b) establishing a common understanding of 'industry best practice'.

This questionnaire has been designed based on commonly accepted benchmarking principles typically used in assessing the efficiency of public sector organisations: *results benchmarking*, mainly based on quantitative data, and *process benchmarking* deriving from qualitative analysis.

Our study aims to assess the following key functions generally found in any civil aviation authority:

- **Policy advice:** This refers to activities connected to the development and implementation of rules and standards (rulemaking), international activities as well as contingency response and planning.
- **Oversight:** In the context of this study, this function is understood to encapsulate all activities connected to the controlled entry, continuous compliance with and controlled exit from the aviation system. Hence, this includes certification (airlines, aircraft and operators), personnel licensing and surveillance activities (audits, spot-checks, inspections).
- **Support functions:** This includes all other functions (i.e. overhead tasks) necessary for the proper administration and management of the organisation.

The emphasis of our benchmarking study is placed on the oversight function, in accordance with the terms of reference of our project,

The questionnaire is structured into three sections. The first part aims at obtaining a better general understanding of your organisation, mandates, legal frameworks (for example: EU vs. non-EU), strategies and organisational structure. These are important elements which need to be duly taken into account when comparing results.

The second section is assessing fundamental base-data and contains tables, which you are invited to fill in with quantitative data such as number of FTE in certain departments, costs, and percentual distribution of staff into functions. This section is, however, meaningful only when seen in conjunction with sections 1 and 3.

Section 3 aims at obtaining insight into five carefully selected core processes (for example: implementation of risk based oversight in your organisation). Answers to the questions in section 3 must not be too detailed as we plan to substantiate these (qualitative) data together with you during our visits, following an initial analysis.

Can we kindly ask you to provide with answers to this questionnaire until.....

We plan to deliver the final report before Christmas, hence all the incoming data will be analysed during October. We will seek clarifications from you as well as more details on the "local context" through the on-site visits, which are planned to take place at the end of October and the beginning of November.

We thank you very much for your valuable participation in this exciting study. Please do not hesitate to contact us should you have any questions or should require additional information.

Marek Bekier : mab@integra.dk; +47 957 917 17

2. General questions

- a) Please briefly outline the national institutional framework in the aviation domain (actors & responsibilities as regards rulemaking & regulation, oversight & enforcement).
- b) What is the legal basis for the CAA function in national law? Please provide the legal reference (legal act and relevant articles).
- c) Please provide with an organisational chart of your organisation and explain how responsibilities for the aviation regulatory functions / domains have been distributed between the various departments / units.
- d) Does your organisation (CAA) share certain overhead functions (for example: IT, HR, Administration) with other entities or within a consolidated Transport Agency? Please describe which functions are shared and indicate the approximate percentage to which these services are used by your organisation.
- e) What are the main funding mechanisms of the CAA? Does your organisation have a target/policy as regards the share of the budget self-financed through service charges?
- f) What is the impact in terms of workload throughout your organisation caused by the centralized rulemaking activities of EASA?
- g) What is your expectation regarding the development of the CAA budget for NSA activities over the next 5 years (as reflected in the RP 2 Performance Plan)

3. Quantitative data collection

Please fill out the following tables with the available data concerning the civil aviation authority. Data for the current calendar year 2014 should be based on the most recent forecasts/estimates.

Key data

Key CAA figures	2011	2012	2013	2014* F
Total staff (FTE)				
Total expenditure (national currency)				
Funding from State budget (% of total annual revenue)				
Income from CAA services (% of total annual revenue)				

National aviation sector	2011	2012	2013	2014* F
Contribution (%) of the aviation sector to GDP				
IFR air transport movements at national airports				
En route ANS service units (SU)				

Staff

FTE per aviation domain	2011	2012	2013	2014* F
Air operations				
Initial airworthiness				
Continuing airworthiness				
Aircrew licensing				
Air navigation services				
Aerodromes				
Aviation Security				
Other (please specify):				
-				
-				
Support functions				
TOTAL				

FTE per function	2011	2012	2013	2014* F
Oversight (% of total FTEs)				
Policy advice (% of total FTEs)				
Support functions (% of total FTEs)				
TOTAL	100%	100%	100%	100%

Expenditure

Expenditure per domain	2011	2012	2013	2014* F
Air operations				
Initial airworthiness				
Continuing airworthiness				
Aircrew licensing				
Air navigation services				
Aerodromes				
Aviation Security				
Other (please specify):				
-				
-				
Support functions				
TOTAL				

Expenditure per function	2011	2012	2013	2014* F
Oversight (% of total costs)				
Policy advice (% of total costs)				
Support functions (% of total costs)				
TOTAL	100%	100%	100%	100%

Expenditure per category	2011	2012	2013	2014* F
Staff costs (% of total costs)				
Other operating costs (% of total costs)				
TOTAL	100%	100%	100%	100%

Policy advice

Breakdown of expenditure per domain	2011	2012	2013	2014* F
Rulemaking				
International activities				
Contingency planning & response				
Other (please specify): - -				

Breakdown of FTE per domain	2011	2012	2013	2014* F
Rulemaking				
International activities				
Contingency planning & response				
Other (please specify): - -				

Oversight

Air operations³⁵	2011	2012	2013	2014* F
Number of aircraft in register				
Number of AOC holders under supervision				
Number of business aircraft operators under supervision				
Number of AOC issued				
Number of audits carried out by the CAA				
FTE per year (excluding overhead)				
Number of qualified inspectors				
Annual expenditure				
Annual income from CAA services				
Aircraft registration fee				
AOC certification fee				

Initial airworthiness³⁶	2011	2012	2013	2014* F
Number of issued certificates of airworthiness ("non-EASA aircraft"), per calendar year				
Number of issued permits to fly, per calendar year				

³⁵ Competent authority tasks within the meaning of Commission Regulation 965/2012, including work in this domain deriving from the application of related national rules, if applicable.

³⁶ Competent authority tasks within the meaning of EASA Part 21 (contained in Commission Regulation 748/2012), including work in this domain deriving from the application of related national rules, if applicable.

FTE per year (excluding overhead)				
Annual expenditure				
Annual income from CAA services				

Continuing airworthiness³⁷	2011	2012	2013	2014* F
Number of maintenance organisations under supervision				
Number of conducted audits				
FTE per year (excluding overhead)				
Annual expenditure				
Annual income from CAA services				

Aircrew licensing³⁸	2011	2012	2013	2014* F
Number of pilot licenses under supervision				
- of which CPL				
- of which ATPL				
- of which PPL				
Number of flight engineer licenses under supervision				
Number of pilot licenses issued, per calendar year				
Number of training organisations under supervision				

³⁷ Competent authority tasks within the meaning of EASA Part M, Part 145, Part 66, Part 147 – (contained in Commission Regulation 2042/2003), including work in this domain deriving from the application of related national rules, if applicable.

³⁸ Competent authority tasks within the meaning of Commission Implementing Regulation 1178/2011, including work in this domain deriving from the application of related national rules, if applicable.

FTE per year (excluding overhead)				
Annual expenditure				
Annual income from CAA services				
Fee for issuance of CPL				

Air navigation services³⁹	2011	2012	2013	2014* F
Number of certified ANSPs under supervision				
- of which ATSPs				
Number of ATS units under supervision (en route + terminal)				
Number of air traffic controller license under supervision				
Number of issued air traffic controller licenses, per calendar year				
Number of audits conducted in the field of ANS				
- of which ATS-related				
FTE per year (excluding overhead)				
Number of qualified inspectors				
Annual expenditure				
Annual income from CAA services				

³⁹ National supervisory authority tasks within the meaning of EU Reg 549/2004, including work in this domain deriving from the application of related national rules, if applicable.

Fee for issuance of ATCO license				
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Aerodromes⁴⁰	2011	2012	2013	2014* F
Number of aerodrome certificates under supervision				
Number of conducted audits				
FTE per year (excluding overhead)				
Number of qualified inspectors				
Annual expenditure				
Annual income from CAA services				

Aviation security⁴¹	2011	2012	2013	2014* F
Number of operators under supervision				
FTE per year (excluding overhead)				
Number of qualified inspectors				
Annual expenditure				
Annual income from CAA services				

⁴⁰ Competent authority tasks within the meaning of Cion Reg 139/2014, including work in this domain deriving from the application of related national rules, if applicable.

⁴¹ competent authority tasks within the meaning of EU Regulation 965/2012, including work in this domain deriving from the application of related national rules, if applicable.

Support functions

Breakdown of expenditure per function	2011	2012	2013	2014* F
HR				
Finance				
Legal service				
IT				
Communication				
Other (please specify):				
-				
-				

Breakdown of FTE per function	2011	2012	2013	2014* F
HR				
Finance				
Legal service				
IT				
Communication				
Other (please specify):				
-				
-				

Resource management	2011	2012	2013	2014* F
Average number of working days per employee (FTE) invested in the training and development of competencies				
Overtime usage (%) of total working time of the agency				

4. Qualitative data collection

a) Implementation of risk-based oversight

Has risk-based oversight been implemented by your organisation?

If yes,

- What is the status of implementation (and, if applicable, deadline for full implementation)?
- Does the CAA use a methodology to assess & classify supervised aviation organisations based on the risk associated with their operations? What risk indicators been developed and used for this purpose?
- Does the oversight methodology implemented by the CAA systematically require inspectors and management to consider the identified risk profiles in determining the scope and the frequency of audits/inspections?
- Has the CAA's operational staff been trained to apply the risk-based oversight approach?

b) Use of IT tools & processes

Please explain what IT tools are available to customers in relation to the following CAA services/processes:

- Registration of aircraft;
- Application for aviation personnel licences (CPL, ATCO licence etc.);
- Application for aircraft operator certificate;
- Continuous oversight of aviation organisations (submission of applications & reports, notification of safety-related changes etc)

Does the CAA plan to increase the number of IT-based tools to customers over the next few years? Please outline the planned changes.

c) Collection of safety data

What mechanisms and interfaces are in place for the collection/exchange of safety data from/with all relevant parties (airlines, aerodromes, ANSPs, MIL, pilots, ATCOs, other regulators etc)?

Are all these processes formalised?

d) Contingency response and planning

What are the CAA responsibilities & tasks in terms of contingency response and planning at national level?

How is coordination with the relevant parties ensured?

e) Human resources planning & Inspector competencies

How does the CAA ensure that its inspectors have and maintain the appropriate competencies for discharging their oversight responsibilities?

What does the initial training of newly recruited oversight personnel consist of?

Are there aviation domains in which the CAA lacks in-house expertise and/or operational staff (inspectors)? Please specify the domains concerned, the faced problems as well as the solutions applied to mitigate or solve the problems.

Has your organisation allocated any oversight tasks to qualified entities over the last three years?

Has your organisation cooperated with other national authorities in order to share specific expertise and achieve synergies? If not, is your organisation planning to engage in such cooperation?

Appendix IV – List of Comments and Actions Taken

Comment number	Topic	Comment text	Comment source	Response
1	General	Vi tror at flere forhold ved norsk luftfart og norsk samferdselspolitikk knyttet til topografi og demografi kunne tas med som ytre forutsetninger for Luftfartstilsynets evne til å løse oppdraget. Dette er forhold som har betydning for dimensjoneringen av Luftfartstilsynets arbeidsporfølje og det påvirker mengder, frekvenser, valg av fokusområder ifm gjennomføring av tilsyn	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	Additional descriptive elements, outlining the volume and complexity of the regulated aviation industry in Norway, have been included in the report (including as regards the offshore dimension). It is not possible to clearly quantify the complexity of CAA work in different countries, but this is done indirectly in the ANS domain (airspace complexity values, effectiveness of safety management indicator).
2	General	I Norge er luftfart en viktig del av vårt innenriks transportsystem med et intensivt nettverk av flyruter som er samfunnsøkonomisk så viktig at staten subsidierer rutene via offentlig anbud (bl.a. kortbanenettet). Rutene vurderes som samfunnsøkonomisk lønnsomme, men er bedriftsøkonomisk ulønnsomme. Som en følge av den politikken har Norge en relativ høy flyplasstetthet (antall flyplasser per innbygger) og også behov for flere ANSP-enheter (f.eks. kortbanenettet).	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015 + email 06.05.2015	
3	General	Kortbaneflyplassene har blitt designet på de «operative grensene» av regelverket. Det medfører at en relativ stor del av flyplassene og behov for tilsynsaktiviteter er vanskeligere å sammenligne med (flyplasser i) andre land som er med i undersøkelsen.	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	

4	General	Vi ser imidlertid at de innsamlede data i er brukt på en slik måte i rapporten at det ikke gir et korrekt inntrykk av faktiske forhold. Særlig gjelder dette tilgjengelige personellressurser, som på enkelte tilsynsområder er fordelt bare på en eller et lite utvalg av de oppgavene som faktisk utføres på området.	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	The benchmark process was conducted in accordance with generally accepted and validated benchmark principles and we have applied utmost carefulness in the processing and interpretation of the collected data. A standardised method was applied to the collection and classification of the data. Data comparability issues were mitigated through the use of data reported to EASA through the SIS system. Additional queries were sent to the benchmarked CAAs in case of ambiguities.
5	AIR	Forståelsen av tilsynsområdet fremstår mangelfull og svak i rapporten. Sammenhengen mellom antall fly på register og ressursinnsats er svært liten, da det er organisasjoner og verksteder som er tilsynsobjektene. Det er kun på området «ACAM ramp» og «In depth» at antall fly på register har en sammenheng med ressursbruken. Antall organisasjoner og verksteder, samt kompleksiteten i disse, er det som dimensjonerer vår ressursbruk.	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015 + email 06.05.2015	After a careful analysis of the issue, Integra considers that the indicator related to the number of aircraft would be appropriate also for the Airworthiness domain – in addition to the indicator concerning the number of approved continuing airworthiness organisations. The CAA is responsible for the issuance and oversight of certificates of airworthiness, which directly relate to the number of aircraft concerned. Furthermore, Commission Regulation 1321/2014 specifically requires CAAs to take account of the number of aircraft on the register when developing its programme for aircraft continuing airworthiness monitoring.
6	AIR	Tallgrunnlaget i rapporten benytter kun CAMO-organisjoner som sammenligningsgrunnlag, men omfatter alle våre inspektører på området uavhengig av arbeidsoppgaver (Part-M, Part- 145 og Part-21). Når vi korregerer for hvem som jobber med hva og sammenligner dette med f eks Sverige, kommer vi ut med samme forholdsmessige tall angående ressursinnsats	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015 + email 06.05.2015	The revised indicator concerning the efficiency of continuous airworthiness activities covers the full scope of approved continuing airworthiness organisations: Continuing Airworthiness Management Organisations (CAMOs), Maintenance Organisations (AMOs) approved either under Part 145 or Part –M subpart F, as well as Maintenance Training Organisations (MTOs) approved under Part 147.

7	AIR	Spørsmålet som ble stillt til Svenske myndigheter var hvor mange personel som arbeidet under Airworthiness. Dette er en egen seksjon i Transportstyrelsen og kalles for Seksjon for Sjø og Luftdyktighet. Her ligger ansvaret for Part M, 145 og Part 21. De har altså en likelydende portefølje som vår TV seksjon. TV er i dag 17 ansatte og Transportstyrelsen har 28.	Email 06.05.2015	This point was clarified through direct communication with Transportstyrelsen. On this basis and after review of all the relevant data (incl. the FTEs allocated to the oversight of MTOs – maintenance training organisations), 1,2 FTEs (of the FTE value of Transportstyrelsen) have been added to the Airworthiness domain. Consequently, this same number of FTEs has been deducted from the Aircrew Licensing domain. This adjustment was not found to impact the findings of the study.
8	ANS	Her er benchmarking gjort i forhold til antall flygeledersertifikater. Dette er et valg av parameter som vi ikke forstår, da Norge har en veldig stor andel AFIS-flyplasser og AFIS-fullmektiger i tillegg til ordinære flygeledere, i motsetning til andre land vi blir sammenlignet med. Når AFIS ikke er med, tror vi det blir feil å bruke antall flygeledere for sammenligning. Vår anbefaling er i stedet å fokusere på antall sertifiserte tjenesteytere.	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	The revised indicator concerning licenses in ANS domain covers both ATCO and FISO licenses. It is complemented by other indicators based on the number of ANSP organisations and ATSP certificates under supervision.
9	ANS	Det er heller ikke tatt hensyn til antall tårn/kontrollsentraler. Hvis tjenesteyteren har en organisering med f eks 3 kontrollsentraler påvirkes vår virksomhet sammenlignet med om det bare hadde vært en kontrollsentral. Antall kontrollsentraler er tjenesteyters valg.	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	It was not possible to include this data as part of the quantitative analysis – however, complexity was examined through the existing airspace complexity indicator and looking at the effectiveness of safety management measures. Furthermore, the specific characteristics (and the related complexity) of the ANS domain were highlighted as background information to the interpretation of the quantitative results.

10	ANS	Det er også andre parametre hvor det for området flysikring er vanskelig å sammenligne direkte med Sverige, Finland og Danmark. Disse har ikke PANS OPS kompetanse som en del av ANS, i tillegg har de så langt vi vet ingen deler av økonomisk tilsyn som en oppgave for ANS. Eksempel som gjelder Trafi, Finland: De har en egen avdeling i Rovaniemi som håndterer alle sertifikater, også ATCO. Dermed vil ikke disse fremkomme som ANS for Trafi i rapporten til Integra. Vi er usikre på om dette er fanget opp i analysen.	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	The number of service providers has been integrated as part of the quantitative analysis. However, it is acknowledged that the ANS regulatory framework encapsulates multiple dimensions, some of which (e.g. FAB and performance scheme tasks) are not directly related to the number of service providers or of supervised controller licenses. As regards the point concerning data comparability (in relation to Trafi), please refer to the response provided for comment nr 4.
11	ANS	Sammenlikning kunne f eks heller vært gjort på antall tjenesteytere. I tillegg kommer den geografiske spredningen av tjenesteytere (Nordsjøen, Svalbard, øst og vest), som i seg selv krever ekstra ressurser. Vi er usikre på om disse forholdene er vektlagt i analysen.	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015 + email 06.05.2015	Additional descriptive elements have been included (please see response to comments 1-3)
12	ADR	Vi kan ikke se at det er tatt hensyn til oppgaver som ligger i flyplass-seksjonen i Luftfartstilsynet, og som vi mener ikke ligger i flyplass-seksjonen hos dem vi blir sammenlignet. Eksempler på dette er luftfarthinder (Sveits har f eks 4 inspektører utenom flyplass-seksjonen på dette) og universell utforming (ligger dette hos andre luftfartsmyndigheter?).	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	Every effort has been made to ensure the comparability of data (please see response to comment nr 4). The effect of different organisational structures is mitigated by using the EASA SIS data. However, the aerodrome domain is not yet covered by this system and therefore the values concerning FTEs in the aerodrome domain are based on the responses obtained through the standardised study questionnaire. We are not aware of any specific data quality issues in this respect, but as highlighted in the report, sectoral comparison results have to be regarded as indicative and based on the best available data.

13	ADR	Det refereres i rapporten til ICAO Code flyplasser. Korrekt antall flyplasser i denne kategorien for Norge er 192 flyplasser. Med 9 inspektører i Luftfartstilsynet (inkludert seksjonssjef) gir dette et annet forholdstall enn rapporten oppgir. Korrekt forholdstall blir da: 21 flyplasser pr inspektør (FTE) og ikke 7 pr inspektør (jf. figur 38, side 61).	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	The indicator has been revised and builds upon the EASA country-specific data on the number of aerodromes within the scope of Commission Regulation 139/2014. This scope comprises aerodromes which are open to public use, which serve commercial air transport, where operations using instrument approach or departure procedures are provided, and which : (a) have a paved runway of 800 metres or above; or (b) exclusively serve helicopters.
14	Support functions	Luftfartstilsynet savner en nærmere redegjørelse for organisering av disse tjenestene i de land som sammenlignes. Videre bør det gjøres rede for i hvilken grad er det tatt hensyn til at en rekke fellesfunksjoner på økonomi og HR allerede er sentralisert gjennom fellesløsninger for statsforvaltningen i Norge.	CAA letter "Foreløpig tilbakemelding på utkast til rapport " 24.03.2015	Support functions were not the focus of this study, but it was considered appropriate to set out general observations on the experience from other organisations. The experience from Denmark shows a possible efficiency gain of 15% (in terms of FTEs) as a result of shared support functions within an integrated transport authority.
15	Support functions	Additional information on IT system	Email 06.05.2015	Included in report