ICAO

ENVIRONMENT

An Environmental Management System for Airports

ECO AIRPORT TOOLKIT

OUTLINE

ICAO | ENVIRONMENT

An Environmental Management System for Airports

ECO AIRPORT TOOLKIT

1. INTRODUCTION

"An Environmental Management System (EMS) provides a methodology and framework to systemically identify and cost-effectively manage significant environmental aspects of aviation organizations' operations and have proven effective across a wide range of organizations, including airports, air carriers, manufacturers and government agencies." [1] EMS is one of the tools available for managing environmental matters at an airport, along with sustainability plans, certifications such as Envision[2], and other processes.

This fact sheet is intended to help airport operators understand what an EMS is about, and decide if they would like to develop one for their facility[3]. It also provides guidance on implementing an airport EMS.

2. WHAT IS AN EMS?

An Environmental Management System (EMS) is a set of management principles intended to identify, evaluate, monitor, and reduce the negative environmental impacts of an organization's activities. It benefits an organization by offering a systematic approach for assessing and controlling ongoing activities, increasing environmental awareness, and complying with relevant regulations. An EMS provides many different and useful tools for detecting, understanding and managing those elements involved in its activities, products and services which have the potential to impact the environment.

The International Organization for Standardization (ISO) defines EMS as the part of the management system that is used to manage environmental aspects, fulfil compliance obligations, and address both risks and opportunities[4].

According to the US Environment Protection Agency (EPA), "an Environmental Management System (EMS) is a set of processes and practices that enables an organization to reduce its environmental impacts and increase its operating efficiency[5]."

The Standards Council of Canada (SCC) explains that an EMS should be able to verify the impacts of an organization on the environment and help it to establish environmental goals and targets, and to evaluate how well they are being achieved[6].

---

1   *ICAO Doc. 9968: "Report on Environmental Management System (EMS) Practices in the Aviation Sector" page 1-2.*
2   *See https://sustainableinfrastructure.org/envision/*
3   *The ICAO Committee on Aviation Environmental Protection (CAEP) asked one of its Task Groups "Land Use Planning and Noise Management" at the CAEP/7 cycle (February 2007), to deliver a report at CAEP/8 cycle (February 2010), on the feasibility of using Environmental Management Systems (EMSs) in the aviation industry. In addition, and as appropriate, the TG was also asked to make recommendations on how CAEP could promote the use of EMS within the aviation system. Therefore, the TG developed an industry questionnaire to better understand the application and potential value of EMSs to aviation organizations. The questionnaire, in accordance with the request from an ICAO State Letter, was distributed worldwide in May 2008 by Member States and international representative organizations, categorized into five different types of respondents, covering Air Navigation Services Providers (ANSPs), airlines, airports, manufacturers and other aviation organizations. Information from 233 organizations, out of 326 that responded to the questionnaire, formed the basis of the Report to CAEP/8 after validation of the data. The responses also served as the basis for two recommendations, which referred to the dissemination of the information from the report, and the consequent development of a guidance document on EMS - ICAO Doc. 9968: "Report on Environmental Management System (EMS) Practices in the Aviation Sector". The following are the Recommendations:*
Disseminate report information. *Within the first year of the CAEP/9 cycle, ICAO should make the information contained in this report publicly available. A report should be distributed specifically to CAEP States and observers and to all survey respondents.*
Develop EMS guidance. *Stand-alone EMS guidance should be developed for the end of the CAEP/9 cycle to assist organizations to determine how EMS elements and principles can be used to enhance the way they manage environmental issues, and provide practical guidance on how these EMS elements and principles can be implemented/integrated into existing management systems and business processes.*
4   ***ISO 14001:2015*** *page 2.*
5   ***U.S. Environmental Protection Agency (EPA) website:*** *https://www.epa.gov/ems*
6   ***The Standards Council of Canada (SCC) website:*** *https://www.scc.ca/en/accreditation/management-systems/environmental*

An effective EMS should be able to set a comprehensive framework to assist an organization in planning, implementing, mitigating and managing its environmental impacts, through a systematic, sustainable, transparent and accountable manner that is coherent with its environmental policy. The overall success of an EMS implementation relies on the engagement of all levels and functions of the organization[7].

2.1   Objectives

The main objective of an EMS is to effectively reduce the impacts of an organization's activities on the environment through a systematic management practice. For instance, in order to mitigate its environmental impacts, an organization has to plan in advance, create a corporate environmental policy and implement different sets of actions. The EMS aims to assist with this entire process.

2.2   International EMS Standards

Below are some often used EMS international standards:

ISO 14001: 2015 Standard

This international standard establishes best practices for an EMS implementation. Such an EMS can be implemented in different organizational models. ISO 14001:2015 is part of the ISO 14000 "family of standards" that focuses on management of an organization's environmental responsibilities, regardless of its type of activity. Specifically, ISO 14001:2015 is based on implementing environmental systems to achieve its objectives while other standards in the family focus on specific solutions such as audits, communications, labelling and life cycle analysis, as well as environmental challenges such as climate change[8].

ISO 14001:2015 summarizes how an EMS can provide added valued for top management to efficiently achieve long term success and at the same time contribute to sustainable development:

- protecting the environment by preventing or mitigating adverse environmental impacts;
- mitigating the potential adverse effects of environmental conditions on the organization;
- assisting the organization in the fulfilment of compliance obligations;
- enhancing environmental performance;
- controlling or influencing the organization's product life cycle;
- achieving financial and operational benefits; and
- communicating environmental information.

EMAS European Standard

The European Union Eco-Management and Audit Scheme (EMAS) is the EMS standard developed by the European Commission to evaluate, report, and improve an organization's environmental performance[9].   Like other international standards, EMAS is appropriate for many different kinds of organizational models – private or public, large or small. EMAS includes additional requirements beyond ISO 14001:2004 such as performance measurements, employee engagement and stakeholder involvement[10]. In addition, EMAS is also considered stricter than ISO 14001 and also provides legal

security through compliance with environmental legislation ensured by government supervision. Table I below provides a comparison between EMAS version III and ISO 14001 version 2015[11].

Topic	Topic ISO 14001: 2015	EMAS: III
Basis	No legal basis, only based on ISO	EU Regulation EN/1221/2009
Goals	System oriented: Improvement of the environmental management system	Performance oriented: improvement of environmental performance
Requirements	ISO 14001: 2015	ISO 14001, plus: - Proof of compliance - Improvements of performance - Staff engagement - External communication - Providing environmental information
Internal Audits	Yes	Yes
External Audits	Re-certification audit every 3 years Surveillance audit annually	Re-certification audit every 3 years Validation of environmental report annually
External Organizations	No involvement	Involvement of environmental authorities
External Communication	Only providing accessibility	Required through environmental report
Legal compliance	Only process required	Proof required

Table I - Comparison between EMAS III and ISO 14001: 2015

3.   BASIC EMS PRINCIPLES

EMS policy statement: top management commitment

The top management of an organization shall commit and express its leadership regarding an EMS through (at a minimum) establishing, implementing and maintaining an environmental policy that, provides a framework for defining environmental goals, and offers a commitment to protect the environment, in coherence with the organization's activities.

Additional leadership commitments are expected by the ISO 14001:2015, such as[12]:

- Providing conditions for the environmental policy to be implemented, to include ensuring necessary resources, support and internal coordination;
- Being accountable for the effectiveness of the EMS.

Planning

An organization using an EMS should identify the required processes and practices to address environmental aspects and compliance obligations, while also dealing with identified risks and oppor-

---

7   **ISO 14001:2015** *page vi.*
8   **ISO 14001:2015 website:** *https://www.iso.org/iso-14001-environmental-management.html*
9   *It was first developed in 1993 and revised in 2001 (EMASII) and 2009 (EMASIII)*
10   **3x3 Good Reasons for EMAS:** *http://ec.europa.eu/environment/emas/pdf/other/Brochure_3x3_Good_reasons_ for_EMAS.pdf*

---

11   *See the* **Fact Sheet** *comparing ISO 14001 with EMAS available online: http://ec.europa.eu/environment/emas/pdf/ factsheets/EMASiso14001_high.pdf*
12   **ISO 14001:2015** *pages 7-8.*

tunities. In order to address risks and opportunities, it is essential to understand the organization and its context, the needs and expectations of interested parties, and also to determine the scope of the EMS, through a comprehensive planning process[13].

Implementation and Operation

The criteria for required operational processes should be established, and required controls should be planned. The organization can also control the implementation of planned changes or improvements into the operational processes and make sure that outsourced processes are also controlled and influenced. Considerations of emergency preparedness and response, and consistency with life cycle perspectives, can also be part of this process[14].

Checking

The organization must continuously evaluate its environmental performance through monitoring and analysis. In this regard, it requires the use of specific methodology, appropriate criteria and suitable indicators that shall be defined in advance. Internal auditing and management reviews can also be part of the defined checking processes[15].

Management Review

The top management of the organization is in charge of reviewing the EMS at defined intervals, in order to guarantee its continued suitability, adequacy and effectiveness. These reviews should include the status of the actions from the previous reviews, including the changes that should be considered, determining which environmental objectives have been achieved, analyzing the overall environmental performance, the adequacy of resources and the opportunity for continuous improvement[16].

Continual Improvement

Through monitoring and evaluation, the organization is able to identify the opportunities for improvement and achievement of the defined environmental goals. This prospect should include the identification of errors and the decision to take corrective actions, in order to guarantee a continuous improvement[17].

Plan, Do, Check, Act (PDCA)

The PDCA principle is a continuous approach applied to both an EMS as a whole and each of its elements. In this regard, it is sort of a combination of the individual principles mentioned above.

- Plan: The advanced establishment of environmental objectives, along with the set of processes and practices necessary to achieve the defined objectives, and in accordance with the organization's environmental policy.

- Do: the implementation of the set of processes and practices according to the defined Plan.

- Check: Constant monitoring and assessing processes and practices compared to the defined environmental policy. Results of this evaluation must be reported.

- Act: take actions to continually improve[18].
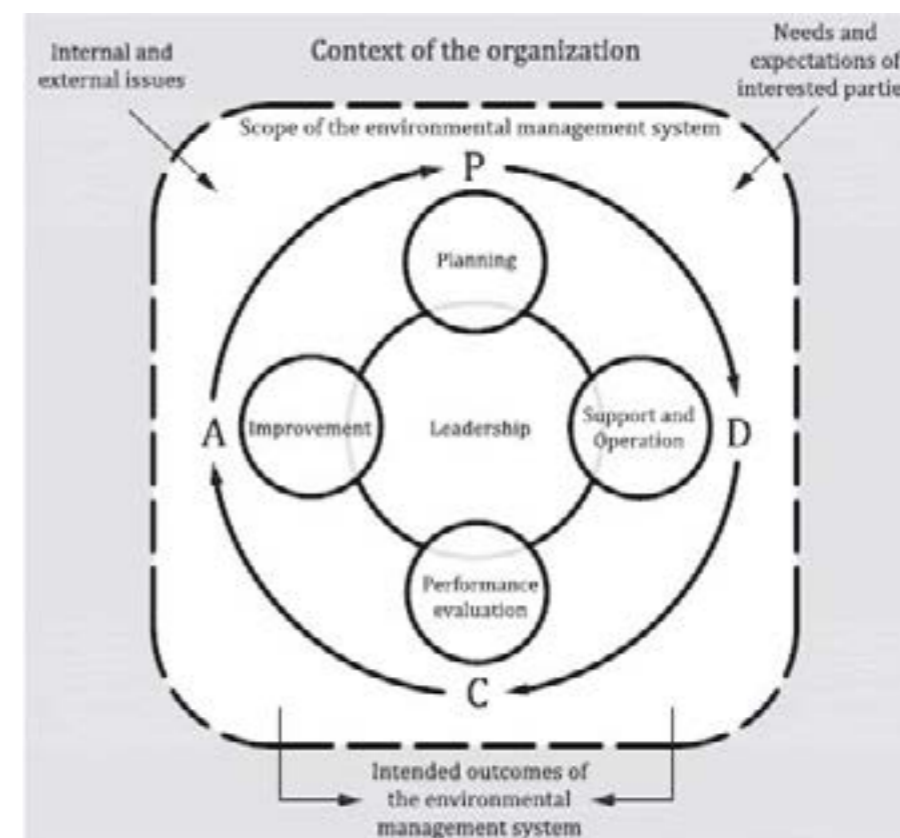

Image I – PDCA cycle approach from ISO 14001:2015[19]

4.   BENEFITS OF AN EMS FOR AN AIRPORT

An EMS provides an organized and systematic means of managing environmental processes at an airport, which can result in multiple co-benefits. A well-designed EMS allows the airport to improve management of operations that have the potential for environmental impact, and to better track and report on regulatory requirements. The EMS process can simplify complex environmental issues by providing a structured framework that makes environmental management more efficient, reduces costs, and allows for continuous improvements in environmental performance.

An EMS improves internal airport management processes, and increases employee understanding of environmental issues and responsibilities. Airports with an EMS have reduced frequency and severity of environmental incidents, and improved compliance with regulatory requirements[20]. In addition, the EMS process facilitates reporting and compliance, and helps demonstrate the airport's due diligence in managing environmental issues. A major benefit of an EMS is to help an airport to identify if there are any gaps in its environment management program and assessment practices. By providing a comprehensive systematic approach to manage an environmental portfolio, the EMS is able to assess the overall completeness of the airport's environment program. This could also improve the health and safety of employees and the public. Together, these benefits amount to reduction in environmental risk, which is the primary benefit of an EMS.

A good EMS process will find synergies with other management systems, such as Airport sustainability planning, Airport Carbon Accreditation, Energy Management Systems (ISO 50001), or spe-

13   **ISO 14001:2015** *pages 6-9.*
14   **ISO 14001:2015** *pages 13-14.*
15   **ISO 14001:2015** *pages 14-15.*
16   **ISO 14001:2015** *pages 15-16.*
17   **ISO 14001:2015** *pages 16-17.*
18   **ISO 14001:2015** *page vii.*

19   **ISO 14001:2015** *page vii.*
20   *Delaney, Elizabeth and Barbara Thomson, 2013, E**nvironmental Management System Development Process: A Synthesis of Airport Practice.** ACRP Synthesis 44, Transportation Research Board. U.S. National Academy of Sciences, Washington DC. (ACRP 2013, p. 24)*

cific programs for storm-water or air emissions. When the goals and activities of these various processes are integrated in an EMS, they can be implemented more efficiently and cost effectively.

Overall, a properly developed and executed EMS will lead to internal consistency by the airport in carrying out activities with environmental implications. An EMS does not relieve the airport of its environmental responsibilities, but it can reduce the costs and time associated with environmental analyses. This improved environmental performance, and the reduction of costs through enhanced efficiency, can help improve public relations. A certified EMS is a strong marketing tool for the airport, especially if it is planning to grow[21]. Table II below summarizes EMS benefits[22].

• Improved environmental performance.
• Reduced frequency and severity of environmental incidents as well as reduced non-compliance with regulatory requirements.
• Improved response to incidents, which may prevent or mitigate their impacts.
• Assistance in demonstrating due diligence.
• Assistance in meeting stakeholder requirements and/or expectations.
• Reduced environmental costs.
• Improved relationships with government agencies and NGO's.
• Reduced environmental risk.
• Synergies when implementing Airport Carbon Accreditation or the Energy Management System set forth in ISO 50001.
• Improved public relations.
• Improved internal consistency in undertaking activities with environmental implications.

Table II - *EMS Benefits*

5. BEFORE YOU START

Whichever the tool chosen to plan and implement an EMS process, it is necessary to consider some essential steps before starting. First and foremost, you need to define the scope of your organization's involvement. For instance, airports can be managed by more than one entity (e.g. one managing airside and another landside). It is also common to have one single entity managing several airports. Therefore, it is necessary to define the boundary of the EMS's implementation. This boundary could be defined by legal responsibility of the entity (e.g. the scope of a concession) or by location, (e.g. just that one particular airport in question).

In addition, the airport organization and its context should be understood in order to "determine external and internal issues that are relevant to its purpose and that affect its ability to achieve the intended EMS outcome(s). Those issues include environmental conditions capable of affecting or being affected by the organization." [23]

When engaging in an EMS process at an airport, it should be discussed with all the organizational parts that can contribute and participate in its development. The most difficult step is to define who is going to lead the entire process: it could be the airport administrator or the aeronautical authority. This should be defined at the beginning. It is important to convene a group of people that represents all the parts of the organization, in order to identify all the internal and external issues that can contribute to developing the airport's context. The team should be capable of describing and considering the organizational goals, policies and the human, technical and financial

resources. Also, it should work on any other external variables that can affect the normal airport operations.

As described in section II, it is also necessary that the EMS is integrated with the goals and activities of the different processes that already exist at the airport. Incorporating the "context analysis" into the management review meetings will not only improve the understanding of the organization but also facilitate the understanding of the macro-environmental issues. [24] For a more structured description of how an airport EMS project can be prepared, please consult Table III below.

Element	Content
Situation	Context Analysis.
Goals	Describes the initiative and the anticipated goals. Environmental policy.
Responsibilities	Identifies who is responsible for the implementation (regulator, airport operator).
Interfaces/partners	Assembles teams of expertise.
Legal compliance	Describes the legal basis on which the EMS is based.
Environmental benefits	Qualifies and quantifies the environmental aspects associated with the different airport procedures. This includes an Initial Environment Review (IER).
Economic costs	Quantifies the costs associated with the implementation of an EMS and the relative cost-effectiveness of environmental management options, noting that there could also be cost savings associated with the measures (for example, social/government penalties).
Interdependencies	Describes potential trade-offs or interdependencies at the management of the environmental effects identified, and provides options to mitigate them.
Implementation	Gives some guidelines on how to implement and operate the EMS.
Time frame	Sets time frames or deadlines for implementation.
Evaluation	Gives an evaluation of the measure and a recommendation for implementation. Internal Environmental Audit.

Table III - *Airport EMS Project*

6. GETTING STARTED

21   Raftopoulou, C., C. N. Kavouras, and P. Karamanos, 2005, *The Environmental Management System of the Environmental Services Department of Athens International Airport, Eleftherios Venizelos. Greenleaf Publishing*

22   *CSA Group, formerly the Canadian Standards Association (CSA)*

23   *Bidwell, Marek, 2015. Making the Transition to ISO 14001:2015. BMS Services. Web: www.bms-services.com [30-05-2017]*

24   *Bidwell, Marek, 2015. Making the Transition to ISO 14001:2015. BMS Services. Web: www.bms-services.com [30-05-2017]*

Airports can develop their management process in different ways. An effective example of an EMS cycle is described in the ISO 14001 standard: the 'plan, do, check, act' cycle. The general process of an EMS is described below, along with the major components found in most EMSs.

Some airports may prefer to hire a consultant to assist in developing an EMS, while others may want to develop it themselves. Either way the same information is needed. Getting started on the process begins with the following steps:

1. A clear environmental policy statement
2. An initial environmental review of the airport
3. An assessment of potential impacts
4. Development of targets to minimize impacts and address policy objectives

A clear environmental policy statement

The initial review can identify the extent to which the airport already has systems in place to manage environmental matters and where gaps exist that should be fixed. The policy statement should include the high-level commitments to prevention of environmental impacts, pollution, and waste, the satisfaction of legal and regulatory compliance obligations, and a commitment to continuous environmental improvements. The policy statement will often outline the airport's mission and vision, and should be tailored to the specific environment and operational needs of the airport. The policy statement must have support from senior airport officials, and should be signed by either the head of the airport's governing board, the senior executive, or a senior airport manager. In addition, the airport must ensure that all employees are aware of the policy and have an understanding of its contents.

An initial environmental review of the airport

The initial environmental review will require gathering information. Following the steps described in ISO 14001: 2015, the basic process is to identify environmental aspects at the airport and determine which of them can have a significant impact on the environment.

- An **environmental aspect** is an element of the airport's activities, products, and services that can interact with the environment in either a beneficial or negative way (e.g. consumption of materials, discharges, spills, etc.).

- An **environmental impact** is a change to the environment, beneficial or negative, resulting from the activities, products, or services.

An example of this environmental review is demonstrated by the Athens International Airport EMS, which covered the activity areas in the box below:

- Managing the environment (EMS)
- Air quality management
- Noise abatement
- Waste management
- Energy monitoring
- Water management
- Environmental auditing
- Bio-monitoring
- Bird control
- Public awareness and environmental education
- Preservation of cultural heritage

An assessment of potential impacts

To get started, identify the airport's environmental aspects, identify the potential impacts of those aspects, assess the significance of the aspects, and assess the level of control or influence the airport has over such aspects and impacts. This information gathering can be done through review of past environmental performance, review of documents and records, interviews with staff and stakeholders, and through direct observation/examination of the airport operations. Determining the significance of the potential impacts may require a ranking system or comparison with certain criteria such as cost, scale of risk, frequency of occurrence, or level of stakeholder concerns. A Leopold Matrix could be a useful tool in order to tackle this task[25].

It is essential to review the legal framework that applies to airport actions for the state in which the airport is located. Legal requirements applicable to airport environmental aspects can include such things as air and water quality regulations, energy use, noise restrictions, or handling of hazardous waste, for example. The EMS process must, at a minimum, satisfy any enforceable legal requirements. It can also simplify the process of documenting and reporting to state agencies and regulators.

Development of targets to minimize impacts and address policy objectives

When significant environmental aspects have been identified, the airport must develop objectives and targets for addressing them. These targets are specific performance requirements set by the airport, and will relate to specific airport operations and environmental aspects. Targets should be measurable, and might include things such as achieving a recycling rate of 10%, reduce nitrogen concentrations in waste water by 20% compared to the 2005 average, or improve the documentation of birdstrikes. Targets can be developed informally through brainstorming and staff knowledge, or through a more formal and structured process of scoring and ranking environmental impacts. The airport's policy statement may set environmental goals and objectives that will influence the targets. The targets are specific performance metrics that must be met in order for the airport to achieve the identified objectives.

Once the airport can identify the processes/procedures that have an environmental impact, an EMS can be designed to manage the processes. Using the information on aspects and targets

---

25   Leopold, Luna B.; Clarke, Frank E.; Hanshaw, Bruce B.; Balsley, James R. (1971). A Procedure for Evaluating Environmental Impact. Geological Survey Circular 645. Washington: U.S. Geological Survey.

described above, design a program to efficiently manage the various aspects and potential impacts. This management system will be a set of processes and procedures that include timelines, resources, roles and staff responsibilities, and other information that will help the airport accomplish the environmental targets and objectives. The EMS is a tool for the airport's management to specify the individuals responsible for specific actions, how communications will take place, the different levels of responsibility, as well as the documents and records that will be produced to report these actions. Ideally, the EMS would streamline the procedures necessary for managing environmental actions, satisfy any legal requirements associated with environmental aspects, and also be designed to improve the overall environmental performance of the airport. In the United States, airport sustainability initiatives are usually included in the EMS process so they can be managed and implemented.[26]

If you want to meet the ISO international standard there are specific requirements that must be part of the EMS, as listed in Table IV below.

ISO Requirements Summarized
1. Identification of external and internal topics that are relevant to achieve the intended results of the management system, including environmental impacts, and of the interested stakeholders, their expectations and binding requirements.
2. An environmental policy supported by senior management.
3. Defined resources, roles, responsibilities and authorities for environmental management.
4. The identification of risks and opportunities with the identification of environmental aspects that the organization may cause and all binding requirements (legal and others).
5. The development of objectives and targets, and their environmental management programs.
6. The development of resources, competence, training and awareness procedures.
7. A communication process of the EMS to all stakeholders and interested parties.
8. The development of documented information, including the records management procedure.
9. The development of operational control procedure.
10. The development of emergency preparedness and response procedures.
11. The development of procedures to monitor and measure operations that can have significant impact on the environment.
12. The development of procedures to evaluate the compliance of binding requirements.
13. A program for completing internal EMS audits.
14. The development of procedures for management review by senior management.
15. Procedures developed for the management of non-conformance, corrective actions and continuous improvement.
Adapted from the ISO 14001:2015 standard (www.iso.org)

Table IV - EMS Requirements

7. IMPLEMENTATION

Once the EMS is developed and there is a system for carrying it out, the next step is implementing the process effectively. The ISO standards encourage using operational controls to achieve the needed level of environmental performance. An operational control is a mechanism that an airport applies to the activities, products, and services of the airport to meet the targeted level of environmental performance. An operational control is intended to prevent or reduce any negative environmental impact from occurring, and to ensure any positive environmental impact occurs or continues. Operational controls are applied to the airport activities and services with potential for significant environmental impacts, and will generally have criteria that specify the level or result the process should achieve. For example, operational controls could include standard procedures for storage and disposal of hazardous waste. In addition to procedures, operational controls could also be interventions in a process, or the addition of technologies like water flow monitors and motion sensors for lighting; by installing such controls, environmental impacts can be minimized. There may be a need to develop operational controls for service suppliers, tenants, and contractors of the airport as well.

A key piece of implementing the EMS, is clear understanding of roles and responsibilities for the various actions. The EMS should identify the airport organization or staff position to perform specific tasks. Ensure that when EMS actions are assigned to staff that person has adequate education, training, or experience to fulfill the assigned tasks competently. Development of EMS training is a good practice, and will be especially helpful when individuals move on and new staff take their place. The EMS may also cover emergency preparedness and response, similar to an emergency response plan, and include procedures regarding who would do what under emergency situations.

Employees should have robust systems for communicating both internally and externally about the activities associated with the EMS. Internal communication between employees of the airport organization is critical for the day-to-day operation of the airport, and that is the same for EMS processes. Likewise, effective implementation of EMS processes will require good external communications, either between airport staff who manage more than one airport, or with parties and organizations outside the airport.

Good management systems are supported by good documentation. The EMS process must include a document control system that ensures documents are readable, appropriate to the purpose, and readily available as needed. Current EMS documents may be in circulation as they are used to carry out processes. There should be a process of record management that makes sure paperwork is accurate, and that records of completed activities are distributed to the appropriate places or archived for future reference. Many organizations find it useful to have the EMS process contained within a single manual, and they may also use the manual to collect the required documentation[27].

The EMS process often results in heightened environmental awareness. A central tenant of the EMS process is continuous improvement. It is common for an airport to find after implementation of an EMS that they must add new processes, develop additional operational procedures, or refine the criteria for success.

9. PERFORMANCE EVALUATION AND AUDITING

Performance Evaluation

The performance evaluation of an airport's EMS should be assessed on a regular basis through monitoring, measuring, analysing and evaluating some of its elements, in order to ensure valid results and the overall effectiveness of the EMS. The airport has to determine in advance what needs to be monitored and measured, and establish appropriate methodology, criteria and performance

26   Delaney, Elizabeth and Barbara Thomson, 2013, *Environmental Management System Development Process: A Synthesis of Airport Practice. ACRP Synthesis 44, Transportation Research Board. U.S. National Academy of Sciences, Washington DC. (ACRP 2013, p. 12)*

27   *Guide to the Implementation of ISO 14001 at Airports. Report produced by CSA International, Toronto, CA, P. 22.*

indicators to do so, alongside with the definition of a timeline when results are to be evaluated.[28]

It is important to retain the relevant documentation containing the performance evaluation as evidence and report both internally and externally the relevant environment performance evaluation[29]. This reinforces the transparency of the system. Compliance should also be evaluated on a timely fashion, defined in advance, by the airport. This gives the opportunity for the airport to understand its level of compliance and also to take any action, if needed.[30]

Auditing

Internal auditing of the EMS at determined intervals is a requirement for an airport to assess the organization's conformity with its own requirements and requirements from an International Standard, if this is the case. This Audit must also assess if the EMS is effectively implemented and maintained, and it is through the audit that legal compliance is monitored and problems are corrected. In order to perform this internal auditing, the airport must establish an internal auditing programme setting a framework defining frequency, methods, responsibilities, planning requirements and reporting. The following elements shall be defined by an internal auditing programme: specific criteria to be used and the scope of the audit; the proper selection of auditors to assure objectivity and impartiality; and ensuring that audit results are reported to relevant management. Table V below summarizes the Internal Auditing Programme main requirements. Changes affecting the airport, the environmental importance of the process and also the result of previous audits should also be taken into consideration[31].

Step 1
Considering environmental benefits, changes to the organization and previous audits
Step 2
Definition of audit criteria and scope
Step 3
Selection of auditors to ensure impartiality and objectivity
Step 4
Report of results to relevant management

Table V - *Internal Auditing Program check list*

9. LESSONS LEARNED

Airports have gained useful experience with the development and implementation of an EMS, and experienced benefits such as improved environmental performance, regulatory compliance and public relations. An EMS implementation, however, may also face some barriers. A study conducted by Airport Cooperative Research Program (ACRP)[32] led to some useful conclusions that are of relevance to this e-publication. They are reported here with a view to bringing the findings to a wider audience of professionals involved in EMS implementation at airports.

Lessons learned from the above mentioned exercise are helpful to provide guidance to airports that are interested in and/or in the process of implementing an EMS. For instance, it was highlight-

ed that several departments, such as maintenance and operations should be directly connected with environment, in order to share responsibility and successfully implement the EMS. In addition, management support was recognized as an important facilitator to justify and actually acquire needed resources. On the other hand, barriers to implementation of an EMS were also identified, such as competing priorities inside the organization alongside insufficient human resource and line management resistance.

Most airports that engaged in the ACRP exercise considered the overall implementation of the EMS and the integration of the system into the organization as their major success while at the same time some airports also acknowledged some issues that they believed could be improved, such as the organization database system to facilitate implementation; the understanding of the ISO 14001 requirements; having a manager for the program; making the EMS a priority; and adequately sharing of responsibility for the system implementation. Finally, when questioned about their future plans, airports replied that they wanted to go beyond compliance, by improving the overall concept of sustainability. The latter has become already a trend in some advanced environmental performants airports which are looking for other additional tools to improve their environment management efficiency.

EMS Responsibilities	Need to engage different departments regarding their environmental responsibility
Management Support	This is necessary to acquire the needed resources for a successful EMS implementa
EMS Benefits	Improved environmental performance; improved regulatory compliance; environmental risk reduction, cost reduction, among others
Barriers to Implementation	Competing priorities inside the organization may represent a major barrier for implementation alongside insufficient human resources and line management resistance
Successes	The overall implementation of the EMS, and the integration of the system into the organization, are successes
Improvements/ What would you do differently	Improve the organization database system to facilitate implementation; improve understanding of the ISO 14001 requirements, have a manager for the program, making the EMS a priority; adequate sharing of responsibility for the system implementation
Future Plans	Go beyond compliance by improving the overall concept of sustainability

Table VI - Lessons learned

---

28   **ISO 14001:2015** *page 14.*

29   **ISO 14001:2015** *page 14.*

30   **ISO 14001:2015** *page 14.*

31   ISO 14001:2015 *page 15.*

32   *The ACRP has assessed lessons learned from 12 airports regarding: EMS responsibilities, management support, benefits, barriers to implementation, successes, improvements and future plans.The following text addressing lessons learned on the above mentioned topics is based on this ACRP study and on responses from 12 airports.*

10. LIST OF ACRONYMS

ACI   Airports Council International

ACRP   Airport Cooperative Research Program

CAEP   Committee on Aviation Environmental Protection

EMS   Environmental Management System

EMAS   Eco-Management Audit Scheme

EPA   Environment Protection Agency

ICAO   International Civil Aviation Organization

IER   Initial Environmental Review

ISO   International Organization for Standardization

PDCA   Plan, Do, Check, Act Principle

11. REFERENCES

ICAO - ICAO Doc 9184 Airport Planning Manual , Part 2

ICAO - ICAO Environmental Report 2016, http://www.icao.int/environmental-protection/Pages/ENV2016.aspx

ICAO - ICAO Doc 9968 Report on EMS practices in the aviation sector

CSA International - Guide to the Implementation of ISO 14001 at Airports

WBCSD - World Business Council for Sustainable Development , http://www.wbcsd.org/home.aspx

FAA - Implementation Guidance for Regional EMS

ACI PRP Handbook - Airport Council International: Policy and Recommended Practises Handbook (2009), http://www.aci.aero/About-ACI/Policies-Practices

SAGA Database - Sustainable Aviation Guidance Alliance: Database containing more than 900 sustainability initiatives, or 529 initiatives on environment; approximately 100 case studies are spelled out. http://www.airportsustainability.org/

TRB ACRP - Transport Research Board/Airport Cooperative Research Program: Synthesis 44: EMS development process- a synthesis of airport practices

ICAO   ENVIRONMENT