**Investigations, Recommendations and Safety Management Systems**

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***Introduction***

Current perspectives on safety management systems (SMS) vary widely from one country to the next, especially with respect to how they are used in the aviation domain. The International Civil Aviation Organization (ICAO) performed a valuable service to the worldwide civil aviation community with the publication of the first edition of Document 9859, *Safety Management Manual (SMM),* in 2006. This landmark document gathered together a host of processes that collectively offered an organized structure within which safety efforts on the part of individual States and other interested parties could be developed. As it stated in its Objective (paragraph 1.2):

The objective of this manual is to provide States and product and service providers with:

a) an overview of safety management fundamentals;

b) a summary of ICAO safety management SARPs contained in Annexes 1, 6, 8, 11, 13 and 14;

c) guidance on how to develop and implement an SSP in compliance with the relevant ICAO SARPs, including a harmonized regulatory framework for the oversight of product and service providers’ SMS; and

d) guidance on SMS development, implementation and maintenance.([[1]](#endnote-1))

ICAO’s intent in assembling a list of SMS guidelines was to offer a set of management processes that could be adopted by State safety programs (SSP), not to suggest other preventive activities should be excluded, discounted or downplayed. However, it has become clear that an unintended outcome of ICAO’s various moves to consolidate guidance on SSPs has been to downplay the role of accident investigations in the SMS environment, or even to disconnect them entirely from other preventive processes.

While one would expect SMS to be tightly coupled with and effective in integrating the work of civil aviation authorities – the regulators – and investigative bodies, the trend seems to be for the latter to be discounted as part of the larger preventive process. The question is, why is this the case and what should be done to address where it is happening?

For a variety of reasons, SMS and investigations – including the recommendations that result from them – are not always a good fit with each other. Some relate to expectations regarding the ability of an SMS to further improve upon the level of safety achieved in flight operations to date. Others seem to stem from how SMS themselves are structured and their focus on trying to identify and respond to “precursors” instead of dealing with known issues. In short, many SMS increasingly are inadequately positioned to incorporate or take action on insights from accident investigations and the recommendations resulting from them.

There are inherent tensions between the respective philosophies embodied by SMS and investigations: a focus on what *might* happen versus what *has* happened; a desire to consider hazards in the abstract instead of focusing on concrete experiences of actual loss; and, of course, the downplaying of “reactive” investigations against support for “proactive” management efforts. Accordingly, this paper explores where safety management systems and accident investigation processes come into conflict, how this has come to happen, and how their disconnects can be remedied.

***The Rise of SMS Thinking***

The history of accident prevention throughout at least the first century of powered flight has been fairly logical, progressively moving forward through a series of sequential, sometimes overlapping objectives:

* Keep aircraft from falling apart or dropping out of the sky;
* Allow them to be operated safely in other than day visual meteorological conditions;
* Require them to be built to protect their occupants in the event things go wrong; and
* Respond to new hazards arising from more and faster aircraft, busier airfields, efforts to drive greater efficiencies by reducing various historically developed safety margins.

From this last has flowed a whole series of philosophies of and taxonomies for safety thinking, all of which have been brought to the table in pursuit of measurable but incremental improvements in the overall safety of the aviation system as a whole. The easy wins are long behind us; the low-hanging fruit has been picked from the trees. Today’s challenges are to find even more opportunities for preventing accidents while trying to avoid *adding* risk to the system in the quest for greater efficiencies in its operation.

Almost from the days of test flights at Kitty Hawk, it became clear that aviation had to be approached somewhat differently from other outgrowths of the Industrial Revolution simply because it was subject to such novel and poorly understood hazards. Exploring those hazards led to accident investigations assuming primacy in aviation safety efforts, and the ways those investigations were conducted evolved to meet new challenges and different fact-finding requirements. Increasingly organized study of accidents and their causes also led to organizational responses that were completely different from current “safety management” approaches. Identified hazards and their solutions were the focus, not the instrumentalities of safety practice themselves.

Those seeking improvements in aviation safety have long been able to identify and meet safety needs without exerting *control* over the rest of the organization of which they are a part. The most effective safety organizations have been developed in response to recognized needs, and the best of them always have been created with a mandate from higher up in their companies or governments and with the leadership backing necessary to do their jobs. Analysis of operating hazards (for the purpose of tackling them) occurred side by side with analysis of accidents and incidents; knowledge developed from such analyses found its way to the desks of those best suited to act on it.

Given the above, with clear evidence of organic development and unforced progress toward what have come to be referred to as “safety policy and objectives,” safety risk management” and “safety promotion,” as well as the evolution of a formal process of data collection and the making of recommendations leading to action – i.e., “safety assurance” – the question becomes, “Is an SMS a natural outgrowth and consolidation of effective preventive efforts, or was the overarching concept deliberately structured or otherwise obliged to remain limited to a subset of proven preventive strategies and activities?”

ICAO’s *Annex 19 to the Convention on International Civil Aviation: Safety Management* took the form it did because ICAO determined that a unifying theory of and approach to civil aviation safety was needed at an international level. ICAO’s efforts in this direction started with Document 9859. That document’s primary objective was *standardizing SSPs*. The term “safety management system” is not even in its title; the concept itself is not addressed in any detail until Chapter 5. There does not appear to be any deliberate effort to create an overarching “safety management system,” but rather to elaborate on and make certain functions and attributes associated with effective SSPs accessible.([[2]](#endnote-2))

To some extent, the rise of safety management systems in their current form coincided with a need to find new ways of dealing with a worrisome slowing in the rate of overall improvement in the aviation safety record. As the raw numbers of airline accidents steadily declined, the even faster growth of airline operations threatened to “make the numbers look bad” despite the occurrences of accidents themselves trending steadily downward. This trend, which was observed at the same time that safety thinking was moving into the so-called “Organizational Era,” made the advent of wide-ranging safety management systems virtually inevitable.([[3]](#endnote-3))

Thus, rather than simply offering a notional collection of minimum programmatic requirements for SSPs, aviation-specific SMS became the embodiment of an earnest desire on the part of the aviation safety community to address the most intractable types of aviation accidents: those with outcomes similar to those seen in historical accidents, but at least partially traceable to the added complexities of modern aircraft and the present-day aviation system.

On the other hand, the *lineage* of SMS – both in aviation and in other domains – is traceable to theories of “quality management,” which long have been proven to be exceptionally effective in production-based activities but of extremely limited value in enterprises where the emphasis is on the delivery of services. Applying SMS thinking to certain aspects of aviation operations – say, maintenance, ramp operations and employee occupational safety and health – makes perfect sense. Indeed, paragraph 2.9.2 of Document 9859 notes more than a half-dozen “typical management systems” found in aviation organizations, including:

a) A quality management system (QMS);

b) A safety management system (SMS);

c) A security management system (SeMS);

d) An environmental management system (EMS);

e) An occupational health and safety management system (OHSMS);

f) A financial management system (FMS); and

g) A documentation management system (DMS).

Document 9859 even goes so far as to assert that SMS and QMS are “complementary.”([[4]](#endnote-4)) However, each of these separate management activities tend to operate in isolation instead of cooperatively since each have their own objectives, defined by their relationship to the larger goals of the enterprise. Regardless, the great virtue of anything based on quality thinking is in the consistency of documentation and process it offers. However, their hidden trap is that the limitations of processes themselves constrain what they are equipped to handle to what is *known*.

***The Institutionalization of SMS***

At this point, a few questions start to suggest themselves:

1. Given the stated intent of both Annex 19 and its predecessor Document, how did aviation SMS take the shape it has assumed in many civil aviation authorities today?
2. Why are at least some ICAO-conforming safety management systems so rigidly structured in terms of both components and processes?
3. What are safety management systems actually expected to *do*?

Answering these questions is not as easy as one might expect, especially given that ICAO’s initial vision of “safety management” was as a starting point for an overarching SSP, not for the development of SMS as an end unto itself.

The opening paragraphs of Document 9859’s Chapter 5 suggest some of the basic expectations that attend the implementation of an “SMS.” These emphasize the “proactive” outcomes expected of the SMS process and the prominence of risk management in the overall construct. However, they do not in any way suggest that any specific strategies toward these objectives should be preferable to others. In particular, they do not dismiss any initiatives or sources of data on the basis of their “reactive” natures – the *goal* is proactive, but the means to that goal are not constrained in any way.

The trouble is, too-rigid safety management systems themselves often bring little new to the table while at the same time rejecting some accident prevention practices that have been refined over time simply because the latter are seen as being “reactive” or otherwise outdated. This is short-sighted at best and self-deluding at worst.

Another driver of the shape SMS began to take was rooted in the safety profession’s long-standing reliance on the “Heinrich Pyramid,” which suggests it is possible to leverage lower-consequence events for insights into the much smaller cohort of catastrophic occurrences.([[5]](#endnote-5)) It is unwise to focus on the former to the exclusion of the latter; preventive medicine is practiced every day, but physicians don’t ignore active bleeding over applying cold packs to bruises. Still, the emphasis on being “proactive” made this aspect of the SMS worldview virtually inevitable.

Finally, the often-desirable separation between civil aviation authorities and investigating authorities seems to have fostered an environment within which SMS processes are deliberately held separate from the work of investigation. This is explicable, but not necessarily appropriate. Investigators have a singular focus, and CAAs must bring other considerations to bear on the feasibility of their proposals. However, accident investigations findings and recommendations deserve to be brought under a “management” umbrella to ensure they are properly considered and implemented where practical. Such handling is not facilitated by the present vision of SMS.

Annex 19 lists the following as being components of a State safety program, not a “safety management system:”

a) State safety policy and objectives;

b) State safety risk management;

c) State safety assurance; and

d) State safety promotion.([[6]](#endnote-6))

Annex 19 also makes it clear that neither an SSP nor an SMS supporting it needs to be limited to the four elements alone. Appendix 2, “Framework for a Safety Management System (SMS),” explicitly states, "The framework comprises four components and twelve elements as the *minimum* requirements for SMS implementation.” *[Emphasis added]*

At the same time, the individual definitions of each it contains show that many traditional aspects of aviation safety do not fit neatly under the new SMS umbrella. Critically, even the amplified discussion of the various components in Appendix 2 leaves open a key issue: where accident investigations actually fit into fully evolved safety management systems. It also is silent on the question of how an SMS is supposed to take action as a part of “assurance”: “performance monitoring and measurement” is a far cry from analysis of data (a basic obligation of SSPs’ “State safety assurance”).

The fact that the SSP and SMS concepts have become conflated over the past fifteen years is evident in that, with the removal of the word “state,” the above SSP components are the key organizing principles for safety management systems as well. In the quest to reconcile the two, the sensitivity to an SMS being “reactive” came to the fore. For example, Argentina’s Administración Nacional de Aviación Civil (ANAC) published *SMS: Guía para la evaluación de la Implementación* (*SMS: Guide for the evaluation of its implementation*) which makes two observations illustrating their system’s incident-oriented perspective and the blurring of lines between SSP and SMS:

* “Mandatory reporting programs and incident investigation programs of service providers are typical examples of programs for the reactive capture of safety data.”
* Internal safety [incident] investigations “include events of an operational nature that do not need to be investigated or reported to the State, for example, turbulence in flight, vehicle events on the ramp, etc.“([[7]](#endnote-7))

On the other hand, the SMS developed by Australia’s Civil Aviation Safety Authority (CASA) uses exactly the same components and guidelines, but explicitly provides for both incident *and* accident investigations as essential components of safety assurance: “Investigating incidents and accidents in a structured way is fundamental to an effective SMS. If you do not investigate incidents thoroughly, you cannot learn from them, and therefore will miss opportunities to identify risks to your operation.”([[8]](#endnote-8))

Despite SMS and SSPs being based on the same four “components,” Annex 19 calls for creation of specific SMS-related policies and processes – and a bureaucratic structure specific to their care and feeding – instead of simply identifying what should be done in constructing a State safety program. This seems at once unnecessary and overly prescriptive. U.S. Army Gen. George S. Patton once said, “Never tell people *how* to do something. Tell them *what* to do and they will surprise you with their ingenuity.”

What’s more, Attachment A contains a qualifying remark that seems to place SMS at a level at least co-equal with SSPs themselves: “The SSP framework introduced in this attachment, and the SMS framework specified in Appendix 2, must be viewed as complementary, yet distinct, frameworks.” In this context, the disclaimer sidesteps the fundamental difference between an Appendix and an Attachment in an ICAO Annex: the former represents “material grouped separately for convenience but forming part of the Standards and Recommended Practices adopted by the Council,” while the latter comprises “material supplementary to the Standards and Recommended Practices or included as a guide to their application.”

In short, in addition to the SMS guidance in Annex 19 failing to incorporate any reference whatsoever to investigations – either accident *or* incident – ICAO’s current approach to SMS seems overly prescriptive and tends to empower SMS as an institution instead of making it clearly subordinate to and supportive of the SSP it should be designed to support. Thus, an *SMS* is the expected outcome of the SARPs; SSPs essentially have been relegated to the role of enabling the operation of safety management systems.

With respect to the role of accident investigations in the context of SMS, Paragraphs 2.10.5 through 2.10.7 in Document 9859 represent the sole ICAO guidance regarding the role of investigations in an SSP (i.e., SMS) environment. Their inclusion strongly suggests that the role of investigations was consciously addressed in the creation of Document 9859, but also that much of that thinking was not brought forward into Annex 19 SARPs.([[9]](#endnote-9))

***How Safety Management Systems Work (and Don’t Work) with Accident Investigations***

The failure of safety management systems to provide for accident investigations and their recommendations in their overall framework eliminates an invaluable source of knowledge for the SSP as a whole. If this was done in the interests of “maintaining investigators’ independence,” it has created a far more perilous situation: a purposeful blind spot regarding the most critical failures and actions proposed to correct them.

Perhaps part of the slippery slope that led to the embrace of safety management systems was the push to be “proactive” rather than old-fashioned “reactive.” Coinciding as it did with the period of slowing rates of improvement in aviation accident rates, this was a reasonable goal to pursue, but to some extent it seemed to look past the fact that most of the easy fixes and easy wins already had been achieved. The mere accumulation of large amounts of data does not automatically translate into actions or new insights.

In particular, the SMS concept seems to consistently downplay the necessity and value of investigations in general and accident investigations in particular. Many safety management systems treat voluntarily submitted, purely preliminary reports not containing enough info upon which to act as if they are superior to reports on investigations of actual occurrences. That take bolsters the underlying philosophy of SMS as “proactive,” supports the notion that “safety culture” has preventive value, and costs a lot less.

Despite this institutional mindset, accident investigations and the recommendations resulting from them need to be properly baked into the fabric of current and future safety management systems. “Proactive” outcomes need not be pursued exclusively through “proactive” sources of data; accident investigations should form the basis for follow-on inquiry, and their recommendations should be scrupulously tracked and managed. Moreover, any inappropriate risk acceptance or inadequate risk assessment discovered during an accident investigation needs to drive changes to the appropriate SMS functionalities. This is the essence of “safety assurance.”

Unfortunately, Attachment A to Annex 19 (which as noted above is *not* a part of the “standards and recommended practices” portion of the Annex proper) places accident and incident investigations under “State safety policy and objectives,” not “State safety assurance.” It is far from clear why this might be appropriate, since the latter explicitly encompasses “safety oversight, safety data collection, and most especially safety data-driven targeting of oversight areas.”

What’s more, paragraph 5.3.92 of Document 9859 notes that safety managers should ensure that “lessons learned from investigations and case histories or experiences, both internally and from other organizations, are distributed widely.” However, this is characterized as a “safety promotion” function instead of a core preventive activity that should be aggressively pursued under the SMS as a function of safety *assurance*.([[10]](#endnote-10))

Finally, the 11th edition (2016) of Annex 13, *Aircraft Accident and Incident Investigation*, has been effectively scrubbed clean of any remnants of references to either SSPs *or* SMS. The previous edition’s Attachment F, “Framework for the State Safety Program (SSP)” was transferred in its entirety to Annex 19 – which makes sense – but there no longer is anything in Annex 13 to suggest that *accident* investigations are in any way a part or a function of SSPs themselves.

Annex 19 is essentially silent on the roles of investigations *or* recommendations in the context of proactive accident prevention. By the same token, Annex 13, chapter 6 talks a *lot* about recommendations, despite the fact that Annex 19 indicates it brought all of the critical elements from Annex 13 into its SARPs for SMS. This leads one to wonder whether or not Annex 13 and Annex 19 – representing the “reactive” and the “proactive” – actually are competing, or even in opposition with each other when it comes to a single approach to safety in civil aviation.

The answer, of course, is that there should be no competition at all. ICAO’s commitment to aviation safety is absolute. However, there *is* competition between the two respective philosophies of accident prevention they represent, which is unfortunate. SMS is no more the “right” strategy for reducing accidents than is any other strategy. It should be informed by any and every approach to prevention available, even if such approaches lie outside the purview of those implementing the SMS itself.

These examples strongly suggest that the very notion of accident investigation is in danger of becoming completely delinked from the *practice* of aviation safety by SMS following the ICAO model. The power and import of accident investigations and recommendations is being diffused through the various SMS components instead of leveraged for their maximum preventive value.

***The Investigator’s Challenges in Working within (and Outside) Safety Management Systems***

As this monograph has made clear, accident investigations *do* make a difference, but the State safety programs and safety management systems with which they need to interact and cooperate have become increasingly distanced from the accident investigation process and products. To address this trend, the air safety investigator community needs to do three things:

* Demonstrate the proven, ongoing value of investigations and the recommendations that flow from them;
* Find the best fit for both the investigation process and its resulting outputs in the context of the existing SMS: and
* Highlight every instance where the structure impedes the effective pursuit of safety. In other words, show where the SMS itself needs fixing.

There are positive examples all over the world that can be pointed out as alternate means of thinking about “safety management” that do not rely on strict conformity to Annex 19. Some state implementations of SMS are far more flexible and inclusive than others.

For example, Transport Canada highlights the fact that, “SMS is based on the idea that you can always find better ways to prevent hazards, so the system will always be changing.”([[11]](#endnote-11)) Their program follows a somewhat different organizational structure as well, rooted in the “4Ps of safety management:” Philosophy, Policy, Procedures and Practices. While the first “P” embodies the generally accepted principle of “safety culture” and the second maps reasonably well to ICAO’s “policy and objectives” component, the latter two are quite different. They are described in their *Introduction to Safety Management Systems* (TP 13739) as follows:

* Procedures - What management wants people to do to execute the policy:
  + clear direction to all staff;
  + means for planning, organizing, and controlling; and
  + means for monitoring and assessing safety status and processes.
* Practices - What really happens on the job:
  + following well designed, effective procedures;
  + avoiding the shortcuts that can detract from safety; and
  + taking appropriate action when a safety concern is identified.([[12]](#endnote-12))

The U.S. Air Force Safety Management System (AFSMS) contains a significantly more detailed mapping of specific preventive activities than that of Annex 19, reproduced in Figure 1 (next page). AFSMS unequivocally establishes *all* investigations as part of the “Assurance” component. It also uses the useful term “improvement opportunities” for that subset of inputs subject to analysis and assessment within the assurance process. This places investigators’ recommendations under the same SMS component as the investigations themselves.



Figure 1. AFSMS (AFI 91-202, *The U.S. Air Force Mishap Prevention Program*, 24 June 2015)([[13]](#endnote-13))

These examples show that it is possible – and even necessary – to think of safety management systems holistically, not just as a fill-in-the-blanks exercise in conformity to SARPs. Each State needs to *start* with Annex 19, but they need not *stop* there.

***The Road Ahead***

As detailed above, the current state of affairs regarding accident investigations in the SMS environment can be summed up in a few propositions:

Proposition 1: The concept of safety management systems is intolerant of investigations and their value because the reactive nature of investigations runs counter to the proactive nature asserted by SMS proponents.

Proposition 2: Fitting investigations into an SMS framework is difficult because SMS often treats the requirement to investigate as a *policy*, the investigative process as *assurance*, and the outputs as information simply requiring *promotion*. That portion of aviation safety dependent on effective risk management is mostly insulated from incorporating or acting upon lessons learned from accidents.

Proposition 3: Investigations do things that safety management systems do not, and State safety programs perform functions that cannot be subsumed under an overarching safety management system. SMS should support SSPs, not the other way around.

Document 9756, *Manual of Aircraft Accident and Incident Investigation*, Part IV: *Reporting*, contains three telling passages that serve to prove why safety management systems cannot do what investigations do:

1.1.1: “The findings and the causes of the Final Report should lead to safety recommendations so that appropriate preventive measures can be taken.” The focus of investigations is not on non-conformities or exceedances; it is on concrete failures and what can be done about them.

4.3: “A safety recommendation should describe the safety problem and provide justification for safety actions.” Accident investigations and the reports resulting from them are designed to *explain*. An SMS simply checks to see if “processes” have been followed and actions required under those processes have been taken or not, regardless of whether or not those actions were appropriate or even valid in the first place.

4.4: “During aircraft accident investigations, safety issues are often identified which did not contribute to the accident but which, nevertheless, are safety deficiencies. These safety deficiencies should be addressed in the Final Report.” You investigate; you find things that need attention; you make recommendations. Under SMS, if the deficiency does not fit into the pigeonholes provided, such non-casual hazards may be lost.

In contrast to these explicit expectations associated with accident investigations, the overseers and advocates of narrowly proscribed safety management systems seem to favor a popular but untested (and to some extent incomplete) philosophy. A rigid SMS comprised only of Annex 19 minimum components promises much based on management theories and assumptions regarding a presumed relationship between accidents and “precursors.” However, it does not explain what should be expected of it upon implementation.

Nothing in the execution of SMS as described in Annex 19 can result in any insights whatsoever regarding why one sequence of events might have a worse outcome than another *except* “incident” investigation. In most cases, the focus of such inquiries is on determining what went *wrong* instead of what went *right*. Still, a forensic (“reactive”) look at such events often is warranted to determine why a more serious outcome did not occur.

Instead, lower consequence incidents are treated as contributing to a “big data” understanding hazards that somehow is to be used to facilitate proactive action. This begs a final question, “What does an accumulated database of *non*-events contribute to the prediction or prevention of more serious ones?”

Like it or not, SMS tends to put two principles in opposition instead of leveraging their respective advantages. It pits the active against the passive, the hard work of investigation and analysis against the easy tasks of collecting and recording. Both have their place in the aviation safety professional’s toolkit, and neither should be disregarded or discounted.

As safety management systems and “proactive approaches” continue to gain prominence, the need for effective investigations and well-founded recommendations that highlight their limitations has never been greater. Too-narrow approaches to prevention ultimately have to be considered in light of the old adage, “When all you have is a hammer, everything looks like a nail.”

1. Endnotes:

   ICAO Document 9859, *Safety Management Manual (SMM)*, 3rd edition (Montreal: ICAO, 2013), p. 1-1. [↑](#endnote-ref-1)
2. At the same time, it is important to note that early indicators of how SMS might evolve in unexpected ways can be seen in Document 9859’s Chapter 2, “Safety Management Fundamentals.” This seems a misnomer; for the most part, the activities discussed in this chapter are aviation safety fundamentals, developed over the past three quarters of a century. Re-branding them as the cornerstones of “safety management” seems to confuse the principle of prevention with that of “management,” but it also opens the door for the next stage of SMS development. [↑](#endnote-ref-2)
3. ICAO Document 9859 charts the history of safety as having proceeded from the “Technical Era” to the “Human Factors Era” to the “Organizational Era.” Discussing the latter, it notes: “During the organizational era safety began to be viewed from a systemic perspective, which was to encompass organizational factors in addition to human and technical factors. As a result, the notion of the “organizational accident” was introduced, considering the impact of organizational culture and policies on the effectiveness of safety risk controls. This new approach is based on routine collection and analysis of data using proactive as well as reactive methodologies to monitor known safety risks and detect emerging safety issues. These enhancements formulated the rationale for moving towards a safety management approach. [↑](#endnote-ref-3)
4. Document 9859, paragraph 5.4.2.7: “Given the complementary aspects of SMS and QMS, it is possible to establish a synergistic relationship between both systems that can be summarized as follows:

   a) an SMS is supported by QMS processes such as auditing, inspection, investigation, root cause analysis, process design, statistical analysis and preventive measures;

   b) a QMS may anticipate safety issues that exist despite the organization’s compliance with standards and specifications; and

   c) quality principles, policies and practices are linked to the objectives of safety management.” [↑](#endnote-ref-4)
5. A cogent monograph on this exact topic, with many well-researched examples, is provided in Fred A. Manuele’s *Heinrich Revisited: Truisms or Myths* (Itasca, IL: National Safety Council 2014). [↑](#endnote-ref-5)
6. Annex 19, *Safety Management*, paragraph 3.1.1. [↑](#endnote-ref-6)
7. Administración Nacional de Aviación Civil, *SMS:* *Guía para la evaluación de la Implementación* (Buenos Aires: Ministerio de Planificación Federal, Inversión Pública y Servicios, 2012) – <<Los programas de notificaciones obligatorias y los programas de investigación de incidentes de los proveedores de servicios es son ejemplos típicos de programas para la captura reactiva de datos sobre seguridad operacional.>> (p. 45); <<Investigaciones internas de seguridad operacional. Incluyen sucesos de naturaleza operativa que no requieren ser investigados o notificados al Estado, por ejemplo, turbulencia en vuelo, eventos de vehículos en la rampa, etc. >> (p. 59) (<http://www.anac.gov.ar/anac/web/uploads/ssp-sms/guia-para-la-evaluacion-de-la-implementacion-para-completar.pdf>) [↑](#endnote-ref-7)
8. Civil Aviation Safety Authority, *SMS for Aviation – A Practical Guide, SMS 1: Safety management system basics* (Canberra: CASA, 2014), p. 11. (<https://www.casa.gov.au/sites/g/files/net351/f/_assets/main/sms/download/2014-sms-book1-safety-management-system-basics.pdf>) [↑](#endnote-ref-8)
9. Other processes that tend to be “reactive” instead of “proactive” get similarly scant attention under SMS architectures that rigidly hew to the “four components.” Two examples of this are “system safety” and “flight operations quality assurance” (or “flight data monitoring”) programs. The effectiveness of both could be greatly enhanced by being incorporated into a broad-based system that leverages their respective products and contributions to safety for use in broader conversations about new prevention efforts. However, such processes external to the “SMS” proper – or worse, not considered part of the larger SSP – tend to be held separate from prevention-oriented “management” initiatives. [↑](#endnote-ref-9)
10. This also begs the question as to the self-correcting nature of SMS with respect to hazards identified in the course of an accident investigation. Even though both “incident reports” and “accident reports” are considered worthy of collection, “hazard documentation and follow-up risk management” is considered part of the “safety risk management” component of SMS per paragraph 5.3.47 and its accompanying Figure 5-3… not as contributing to the broader “safety assurance” component. [↑](#endnote-ref-10)
11. <https://www.tc.gc.ca/eng/civilaviation/standards/sms-menu-618.htm>. [↑](#endnote-ref-11)
12. Transport Canada, *Introduction to Safety Management Systems (TP 13739)* (Ottawa: Government of Canada, 2001), p. 2. [↑](#endnote-ref-12)
13. <http://static.e-publishing.af.mil/production/1/af_se/publication/afi91-202/afi91-202.pdf> [↑](#endnote-ref-13)