BFowles, **Improving Investigations and Safety Through Modern Aviation Emergency Management**, June 28, 2023

Improving Investigations and Safety Through Modern Aviation Emergency Management

Brad Fowles BTech EMGN - ISASI #M06199
Emergency Management, Investigations, and Safety, Transport Canada, Aircraft Services Directorate

Brad has 40+ years' experience in emergency and safety management and has authored emergency plans for airlines, airports, governments, industry, municipalities, and communities. He is an experienced executive leader, and Captain having flown in airline, flight-test, corporate, and military environments.

Brad works for Transport Canada, Aircraft Services Directorate where his duties include emergency and safety management, investigation, Chair of their National Wellness Committee, flying, and teaching investigation techniques, emergency management, and SMS. He was the Chief Pilot, RPAS, a Type A Check Pilot, and developed their FOQA program.

A trained ICAO auditor, he holds an Emergency Management degree and a certificate in Aviation Safety and Security.

"Fortune favors the prepared mind."
Louis Pasteur

Introduction

The theme for this year's seminar is "*Accidents: The Current Which Lies Beneath*". It addresses the sub-surface factors that often go unnoticed and lead to unwanted outcomes. In this paper I will describe a different type of *Current Which Lies Beneath*. This current runs against the unwanted ones. It can proactively identify and mitigate some of those insidious sub-surface factors that might have otherwise gone unnoticed.

We are going to look at emergency management (EM), and more specifically, Aviation Emergency Response Planning. I suggest that EM is a current which lies beneath because some organizations are still concerned that, if they talk about it publicly, they will be admitting that something could go wrong. It's an old way of thinking but it's still out there. The problem that mindset causes is a lack of understanding and recognition of the systemic benefits a well written, trained, and exercised Aviation Emergency Response Plan (Plan) can bring to important areas such as investigations, Safety Management Systems (SMS), regulatory relationships, and even business dealings.

Of course, there is also the important compassionate side to EM. Leading operators know that a quality emergency management program is more than just a regulatory requirement. They care about their employees, passengers, and operations. They understand that being prepared in advance is an important part of their responsibilities. I am fortunate to work for such an employer. In this paper, I will detail concepts and considerations used in developing Aircraft Services Directorate's (ASD) Plan, plus how we train and exercise, to demonstrate the ways EM contributes to enhanced investigation outcomes and continuous safety improvement, as an important component of our SMS.

I hope that by demonstrating the benefits of emergency management and planning we can bring it above the surface, where it can be even more effective.

The Emergency Management Continuum as a Continuous Improvement Loop

Let's start by looking at an emergency management continuum to identify where the Plan is situated (Figure 1[i]).

Plans are commonly identified as existing only within the preparedness section. However, when we look at the process of developing a Plan in its entirety, we can identify portions of the Plan in each of the four sections. This is significant because the emergency management continuum is also a continuous improvement loop, like the familiar Plan-Do-Check-Act (PDCA) cycle[ii] that is a popular model used to improve Safety Management Systems.

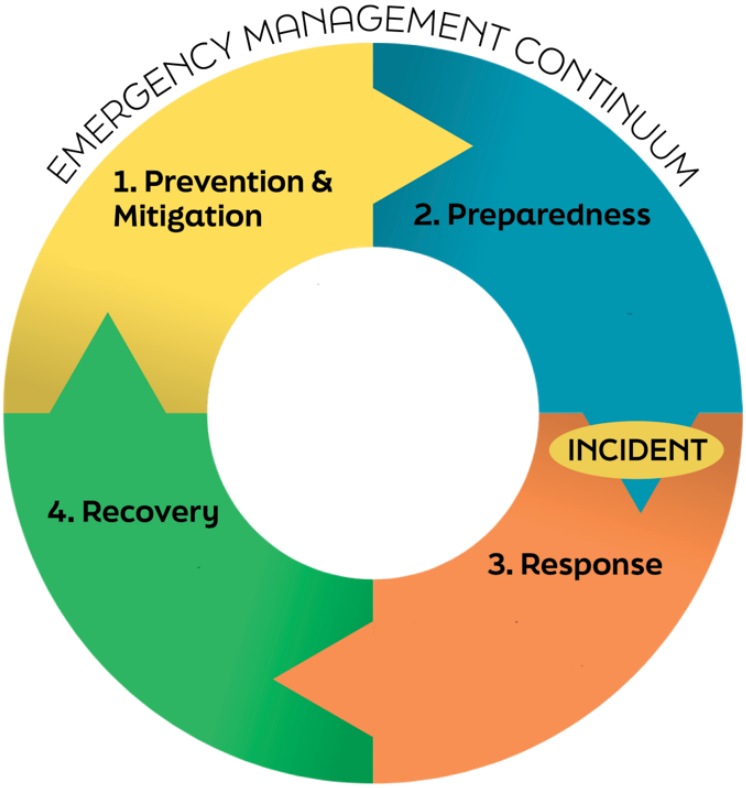

Figure 1

Prevention and Mitigation

This is the starting point, not only for the emergency management continuum, but also it is where much of the SMS work within an organization occurs. So, let's have a brief look at where emergency management fits within the SMS framework.

Transport Canada provides guidance on the development of Safety Management Systems for certificate holders and details the 6 components and expectations that are the foundation of the Canadian system. One of those components is aviation emergency response planning. The International Civil Aviation Organization (ICAO) mentions aviation emergency response planning in several Annexes including their SMS Annex 19[iii]. According to ICAO: "*Appropriate*

immediate and coordinated actions in response to emergencies and disruptions can significantly mitigate the severity of their impacts. It is therefore critical that stakeholders involved in air transport operations have in place emergency response and contingency plans (ERP) to ensure a rapid response and swift restoration and return to operations. An ERP is a comprehensive, operational-level document outlining specific roles, set of actions and timeframes to respond to unexpected situations, disruptions, or potential disruptions[iv]."

When an organization decides to write a new Plan, or update an existing one, they use many of the same tools that already exist within their SMS. The results of that work not only inform the Plan, but also contribute to the proactive identification and mitigation of existing and evolving hazards. Procedural improvements, identifying training opportunities, locating regulatory gaps, and staying ahead of an ever evolving hazardscape, are also benefits that can be achieved.

Aviation is a complex and interconnected business. Working together collaboratively is a foundational aspect of SMS. An effective EM process requires collaboration with internal and external partners. This fosters the development of a strong safety culture, open communication, and information sharing which all help to prioritize safety as a shared value.

It has been my experience that the benefits of collaboration extend beyond how people work together; it leads to increased success through the generation of innovative ideas and improved workflows.

Preparedness

This is the stage where writing the Plan occurs. The Plan is a key component of preparedness as it establishes clear protocols, procedures, and guidelines for various stakeholders and types of emergencies. The Plan documents the concept of operations, defines roles and responsibilities, establishes communication protocols, identifies available resources, and provides for a coordinated emergency response. The Plan enhances readiness to respond to emergencies effectively, reducing confusion, and maximizing the efficiency of response efforts. A good Plan will also assist the organization to continue operations during the emergency because they have an identified, trained, and practiced Emergency Response Team (ERT) managing the emergency.

Response

During the response phase, the Plan serves as a crucial reference and guide for all team members involved in managing the situation. It provides a structured framework for decision-making, outlines communication channels and protocols, and clarifies the chain of command. This coordinated response enables team members to mobilize resources and implement actions promptly. This will minimize the chaos that can occur during and after an emergency.

During the response phase, individuals who are deployed as members of the Emergency Response Team will have Emergency Response as their primary role. This is crucial in allowing other business operations to continue normally while the trained ERT manages the emergency.

Recovery

Finally, the recovery phase focuses on restoring normalcy and improving systems to reduce the chances of future emergencies. Many important lessons can be learned during and after an emergency, and these can be used to improve overall safety and to update the Plan itself.

In summary, the emergency management continuum is an important part of SMS, and a Plan is not limited to the preparedness phase. The Plan makes contributions to all parts of the emergency management continuum, and to SMS by helping prevent and mitigate safety issues, enhancing preparedness and response efforts, and supporting effective recovery strategies.

"By failing to prepare, you are preparing to fail."
Benjamin Franklin

The Three Most Important Areas to Consider in a Plan

Now that we've looked at how planning fits into the EM continuum, and identified that EM is a component of SMS, let's take a high-level look at the three areas that should be covered in a Plan.

- People
- Investigation
- Administration

All bases will be covered if these three principles are kept in mind when writing, training, and exercising a Plan.

First and foremost is supporting people

This is called Personnel Care in ASD's Plan, and there is nothing more important. The impact an accident or incident can have on individuals who were involved, including survivors, family, and colleagues, can be profound. The Plan should recognize the importance of providing post incident support and counselling. By planning to address the physical and psychological wellbeing of those involved, the Plan fosters a supportive environment that encourages open communication and cooperation. Open communication and cooperation will benefit investigations and SMS as well.

When putting systems in place to support people, it is also important to recognize that certain individuals who have a role to play in the Plan, such as Personal Care Team members, or investigators, will be called upon to support others, often in a challenging peer-to-peer environment. It is critical to recognize the value these folks bring to the task, and to support them by providing tools they need to not only help others, but also to protect their own psychological well-being. There are many options for this such as Mental Health First Aid training programs, but regardless of what is chosen, it is important to make quality programs available to personnel in advance of them needing it.

Second is supporting investigation processes

This is called Operations in ASD's Plan. ISASI members are aware of how and why investigation plays a crucial role in improving safety. One thing that is not often discussed however is the value a good emergency management system can have in contributing to

improved investigation outcomes. A pre-planned coordinated, collaborative, and cooperative approach will contribute to the protection and preservation of critical evidence and access to information for investigators.

Third is administration

This is where support is received for finance, IT, security, insurance, legal, and media issues. By addressing these issues in advance, when immediate support is needed, many of the inevitable hurdles will have already been identified and mitigated.

"Hoping for the best, prepared for the worst, and unsurprised by anything in between."
Maya Angelou

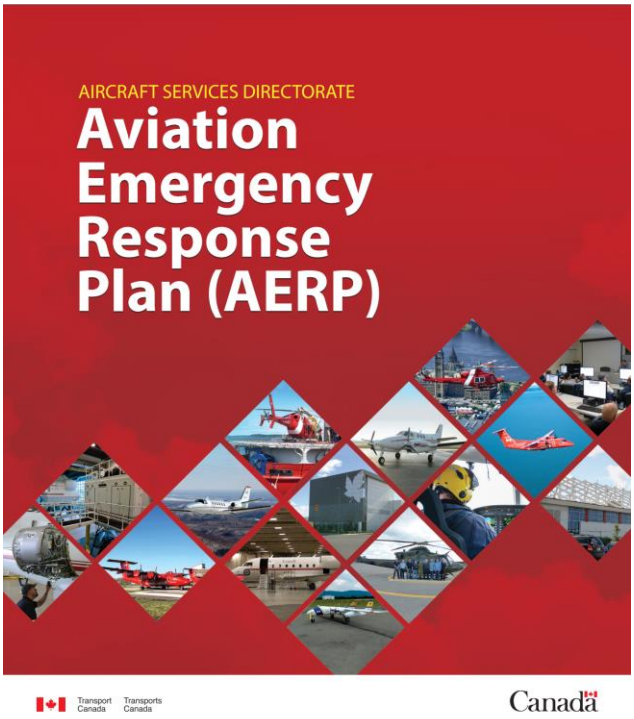

Figure 2

Planning Concepts and Considerations

The project ASD undertook to modernize its aviation emergency management system provided us with more than just new plans (Figure 2) and the ability to respond to emergencies more effectively. In tangible ways, the development of new headquarters and base plans, training, exercising, and responding to actual emergencies, has helped me and other investigators improve the outcomes of our work, and it has contributed to continuous safety improvement as an important component of our SMS.

The following information is provided to share some of the valuable planning concepts and considerations that contributed to these positive outcomes.

Detailed Checklists

ASD's users of previous plans said they wanted detailed checklists, and our Plan has them for each function identified. Having detailed checklists not only provides guidance for that function, they are also a handy tool for leaders to reference for heightened situational awareness of what is happening in all areas.

Planning for the Worst Case

It is valuable to provide guidance and checklists for a worst-case scenario and ASD's Plan provides this ranging from first being informed of a potential problem, to a major aircraft accident. It is helpful to have worst case scenario information readily available before an incident occurs rather than trying to figure out what needs to be done during an actual major emergency.

Most Plan activations will be for incidents less serious than a major aircraft accident. In those cases, the flexibility built into ASD's Plan guides the ERT through the range of severity considerations.

Electronic Plans

The decision to modernize our emergency management system provided ASD with several opportunities. One was making the Plan available in multiple formats including printed, on desktop computers, tablets, and smart phones.

One of our goals in developing a fully electronic version was to reduce the number of printed Plans in the system. The advantages included individuals no longer needing to update the paper version, electronic Plans are always up-to-date, and less costly. When we introduced this idea several ERT members indicated they wanted both a printed version and electronic access. So, we continue to make controlled printed versions available where appropriate.

Emergency Response Team

In the ASD Plan, individuals who will participate in an emergency response effort are called Emergency Response Team members. The actual composition of the ERT is determined based on the nature of the emergency they are responding to.

It's important that they are identified as a separate group so that when the team has been activated, it is known that emergency management will become part of (or all of, depending on the function) their duties and responsibilities as long as their function remains active. This results in a better emergency response and support for the continuation of normal business operations outside of the emergency.

Training

Providing training will often identify areas for improvement and will set participants up for success. Exercises and activations can be stressful. Being well prepared in advance will take a lot of that stress away.

Two different training programs are provided at ASD. AERP 100 (Figure 3) is a mandatory, one-hour, on-line course that every employee from summer students to executive management is required to complete.

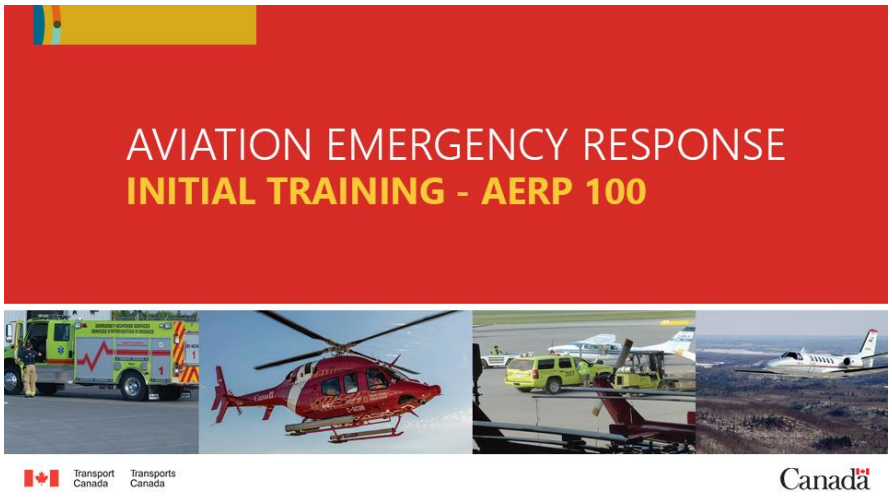

Figure 3

The second course, AERP 200 (Figure 4), is mandatory for anyone who may be expected to play a Plan-based role during a response. AERP 100 is a required pre-requisite.

It is a walk-through of the Plan, including the use of realistic examples of each of the incident categories. This course gives participants a chance to familiarize themselves with their roles and to ask questions of the facilitator.

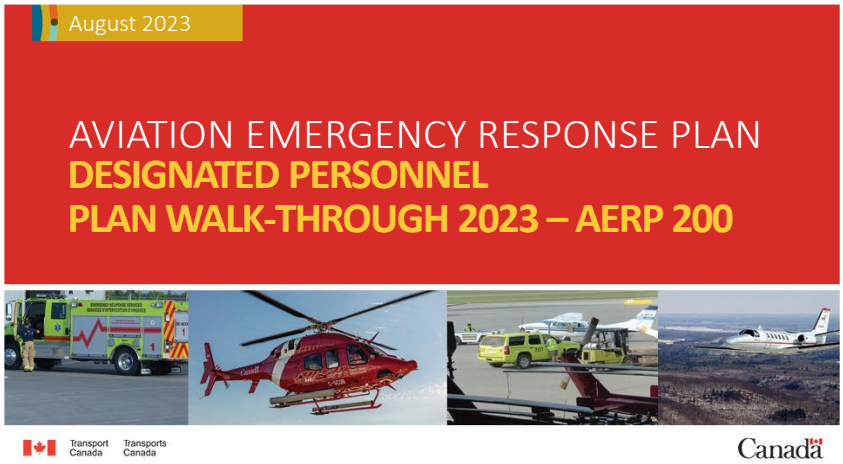

Figure 4

Exercise – Exercise – Exercise

Exercises are an invaluable part of our SMS as they provide training, identify weaknesses, enhance collaboration and communication, and foster continuous improvement. They play a vital role in mitigating risks and enhancing the overall safety of operations.

Using standard hazard identification and risk management tools, areas are identified and prioritized to be exercised. Exercises are scheduled well in advance to ensure they are coordinated effectively internally and with our partners, and to assure resources are available as a recurring part of the normal business cycle.

Hybrid Emergency Coordination Centres

At the beginning of the COVID pandemic I was deployed to Transport Canada's facility based National Emergency Coordination Centre (NECC) in Ottawa. This is when I was first introduced to Microsoft Teams. At the time, MS Teams was used primarily as an instant messaging application, and we had a typical emergency coordination centre setup with large moveable computer screens, televisions, white boards, and computer workstations.

It wasn't long before the decision was made to move most employees to remote work locations in their homes. As we were up and running with a busy schedule when we moved to the remote model, we had to figure out how to keep our work going seamlessly from our homes in a very short period. Transport Canada's IT personnel were amazing at ensuring we had what we needed while we started to develop ways to use MS Teams and other tools to keep our emergency operations running smoothly. There was no roadmap available, but we made it work.

Fast forward three plus years and we now have a highly successful hybrid model in place.

The only significant challenge faced so far is providing outside agencies with access to our MS Teams, Emergency Response Team. This may not be an issue for other organizations, but for the Federal Government, security policies block outside organizations, even other government departments, from accessing our tenancy. We can have external participants on MS Teams calls; however, we can't invite them to become members of a specific Team or share documents with them. That is a limitation that is being worked on, and at the time of writing this paper, reportedly a solution will be in place soon.

Keeping Pace with The Ever-Evolving Hazardscape

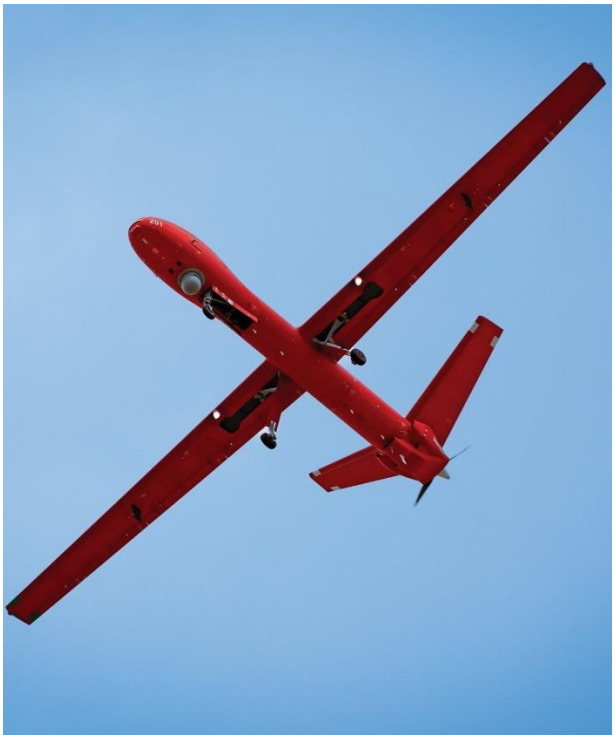

Figure 5

It is important for Plans to keep pace with the inevitable changes that occur in the increasingly complex and dynamic world of aviation. These changes necessitate continued adaptation to remain prepared and resilient. As an example, ASD has begun operating Remotely Piloted Aircraft Systems and will soon take delivery of a Hermes 900 Starliner (Figure 5).

To ensure ASD's Plan is keeping up, we began gathering emergency management information about the Starliner as soon as it was ordered and are planning a Tabletop Exercise involving it before it flies with us for the first time. The changes within your hazardscape might be different, but the process to manage them is the same.

Base or Outstation Plans

If your organization operates from more than one base, it is a good idea to have base plans in place.

Base plans do not need to be complex, but they do need to coordinate activities within an organizations structure. For example, if an organization has a headquarters centric administrative structure there is no need to reproduce headquarters management and resource allocation information in every base plan. The base plan should include local procedures and have checklists and guidance for each of the emergency categories in the HQ plan, and those should be amended to reflect the actions that base personnel would take under each category.

Some Plan Limitations

While guidance is provided on how to prepare for and respond, a combination of unknown and unpredictable factors will always be involved in an emergency. Type of aircraft, geographic location, weather, presence of company personnel, passengers, foreign government control, and the nature and extent of damage or injuries are but a few. That is why, when managing an emergency, it is necessary for those involved to exercise initiative, flexibility, and common sense in reacting to the events and circumstances surrounding an incident.

Conclusion

I hope through demonstrating some concepts and principles of aviation emergency management and planning, and where that fits in the safety and emergency management spectrums, I've shown that integrating these concepts and principles into an SMS can enhance an organization's ability to prevent accidents, improve the outcomes of investigations, and contribute to continuous safety improvement.

Let's keep moving emergency management from the current that lies beneath, to above the surface, where it truly belongs.

---

[i] https://www.md.bonnyville.ab.ca/507/Emergency-Management
[ii] https://tc.canada.ca/en/aviation/reference-centre/advisory-circulars/advisory-circular-ac-no-107-001
[iii] https://www.icao.int/sustainability/ERP/Pages/ICAO-ERPGuidance.aspx
[iv] https://www.icao.int/sustainability/ERP/Pages/default.aspx