**Advancing air safety in the North**

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*Check against delivery*

**Slide 1 – Title Page**

Thank you very much for inviting the TSB back to make another presentation this year.

The Board very much welcomes the opportunity to speak to you and our prominent position on your agenda demonstrates your own commitment to advancing air safety.

**Slide 2 – Outline**

Of the many issues that preoccupied the Board over the course of the past year, a couple stood out.

One of these is: What can be done about operators who have a poor safety culture? The traditional and commonly recommended methods of increased government supervision cannot always guarantee that an accident will be avoided. More importantly, such techniques in and of themselves will never create a safety culture in a firm that does not have one.

The second issue is the need to drive down the number of accidents involving those aircraft governed by subparts 702, 703 and 704 of the *Canadian Aviation Regulations (CAR)*.

These two issues led the Board to consider what factors drive safety within an organization and, more importantly, *who* drives safety within an organization. In a moment I will share with you some questions we can ask ourselves which may improve our ability organize for safety.

It would not be a TSB presentation if we did not talk about our Watchlist—the list of issues posing the greatest risk to Canada’s transportation system—and today I will focus on two issues in particular: CFITs (controlled flight into terrain) and SMS (safety management systems). I’ll refer to some of our reports over the past year to illustrate some of the things we have seen.

We’ll also have a look at what the Board had to say about lack of a safety culture, which was found to be contributory to an accident.

And, before I conclude, I’ve got some comments about lightweight flight recording devices, and the potential of these devices to help prevent accidents.

**Slide 3 – Statistically Significant**

One statistic that is getting the Board’s attention is the relatively high number of accidents and fatalities in the 702/703/704 world, especially compared to the 705 world. 91 percent, that’s the percentage of commercial aircraft accidents that involved these smaller operators over the past ten years, such as those doing aerial work or which provide air taxi or commuter services. And together, they accounted for 93 percent of commercial aviation fatalities.

These smaller operators face challenging conditions, such as difficult terrain, and they typically fly into smaller, more remote airports with less infrastructure. They may fly smaller, older aircraft with less sophisticated navigation and warning systems, which causes higher workloads for crew.  Flight crews working for these operators are often working their way up in the system and may have less training and experience, and may not have ready access to decision-making information or to mentors who are able to pass on their experience.

These are among the challenges we will have to address if we are serious about tackling the causes of accidents in the 702/703/704 world. Unfortunately, the factors leading to these accidents repeat with some regularity, and they often involve the “softer” side issues of operations, such as pilot decision-making, adequacy of training, and effectiveness of supervision. The days of finding the Eureka moment in aviation accident investigation are pretty much over, and it will be less certain moving forward what will be the most effective solutions to reducing this accident and fatality rate. Fortunately, there are a number of promising developments which we can consider to meet these challenges, not the least of which is Safety Management Systems, along with new and inexpensive technology that is becoming more available every day.

**Slide 4 – Organizing for Safety**

Before getting into that, however, I wanted to take a moment to share with you some thinking we have done on the question of what factors drive safety in an organization, and, more importantly, *who* drives safety within an organization. Traditionally in aviation, safety analysis has tended to focus on the bottom of this pyramid—that is, operations. These inquiries are usually focused on the questions of *what* happens or, after an accident, on what happened. As we increasingly focus on *why* people do what they do, we are naturally driven up the pyramid. Increasingly, the TSB is looking at whether and how hazards were mitigated by formal and informal Safety Management Systems. Because we are really just beginning with SMS, even for the 705 carriers, sometimes this entails consideration of the role of management in the implementation of these systems and whether or not, these systems are effective as implemented. I will have some examples of this later in the presentation.

As we continue to move up the pyramid, we come to safety culture. Most experts in organizational behaviour will tell you that an organizational culture takes years to develop. The experts in this room, I am sure, will agree with me that without a good safety culture, an organization is bound for trouble.

The old saying is that everyone answers to somebody. So who do senior managers in aviation firms answer to? An exploration of this question leads in two directions. First, it leads to the question of corporate governance and the arrangements that are in place to hold senior management accountable for safety decisions. The other direction is oversight. Here, though, we are not just talking about the regulator but about any outside player who might exert positive influence on a company’s safety decision-making.

**Slide 5 – The Role of Governance in Safety Management**

So who does senior management answer to? To owners, to boards of directors and—ultimately—to shareholders, to investors, and to financial backers. On this slide you can see some of the questions that could be asked if you were going to look at how the governance framework could be used to enhance safety.

**Slide 6 – The Role of Oversight in Safety Management**

In considering oversight as a means to achieving improved safety, you might look at the role of insurers and customers.

Insurers: Do insurers consider safety in the decision to insure? To what extent do insurers influence safety?

Customers: More and more in its investigations, the Board is seeing customers influencing safety by imposing requirements on their aviation service suppliers. We see this most often in the charter business and in situations where there is a long-term relationship, such as in the offshore oil industry in Newfoundland and Labrador or, as is the case with Hydro Quebec, the purchase of helicopter services. We also see it in the relationship between tier one carriers and the other carriers they partner with. We can expect to see more of this.

Accident Investigations: What is the impact of an accident on a company? Do organizations learn from accident investigation reports? What drives an organization to make safety changes as a result of an accident?

**Slide 7 – The Role of Oversight in Safety Management (cont’d)**

In discussing oversight, it is the oversight role of the regulator which seems to get a lot of public attention whenever a problem with aviation safety is identified. I pose a couple of questions here which you can think about during the rest of the presentation.

Do we have realistic expectations about the extent to which regulators can influence day-to-day safety? What kind of regulatory oversight is required?

**Slide 8 – TSB Watchlist**

In 2012, the Board released an updated version of its safety Watchlist, which highlights the issues posing the greatest risk to Canada’s transportation system. As I said earlier, I’d like to look at two of those issues today.

**Slide 9 – TSB Recommendation A12-02**

EXACT AIR

On a snowy night in December 2009, a Beech King AirA100, operated by Exact Air, Inc., was on approach into Chicoutimi, Quebec. Onboard were two pilots and two passengers. The aircraft was three miles short of the runway on the centreline of runway 12 when it flew into the ground, killing the two pilots and seriously injuring the passengers.

For undetermined reasons, the crew had continued its descent below the published approach minima, leading to controlled flight into terrain (CFIT). One of the issues the Board looked at in this accident was the increased workload from the “step-down” technique required to execute non-precision approaches (NPAs) as they were typically depicted.

**Slide 10 – TSB Recommendation A12-02 (cont’d)**

Air taxi operators generally serve airports that, in many cases, are only equipped with non-precision approach capabilities. The 1217 non-precision approaches (at the time of the report) in Canada account for 91% of all the CAP[[1]](#footnote-1)- published approaches. The Flight Safety Foundation’s (FSF) Approach and Landing Accident Reduction (ALAR) task force determined that the risk of approach and landing accidents (ALAs) was five times higher for non-precision approaches than precision approaches. In addition, the majority of accidents involving air taxi operations are ALAs, which account for 70% of all commercial operation ALAs.

The Board’s recommendation was based on a comparison of the two techniques for completing the final descent on a non-precision approach: step-down descent, and final descent on a stabilized constant descent angle (SCDA).

The step-down descent technique involves flying an aircraft to a series of published minimum altitudes. This requires multiple changes in attitude and power to maintain a constant speed throughout the descent. This technique also relies on prospective memory, which requires a heavier workload and more cognitive effort than a final descent on a stabilized constant descent angle. Consequently, whether a crew is tired or not, they are more vulnerable to making errors inherent in the execution of the step- down approach.

The SCDA technique involves intercepting and maintaining an optimum descent angle to minimum descent altitude (MDA). The descent is therefore flown at a constant angle and constant rate of descent, requiring no configuration change.

The task simplification associated with the SCDA technique reduces the cognitive effort required for the approach, thereby reducing the workload and, by extension, the risk of error.

Therefore, the Board recommended that:

“The Department of Transport require the use of the stabilized constant descent angle approach technique in the conduct of non-precision approaches by Canadian operators.” (A12-02)

*Board Concern*In 1998, the Flight Safety Foundation (FSF) Approach and Landing Accident Reduction (ALAR) task force issued recommendations targeting the reduction and prevention of approach and landing accidents. An ALAR “toolkit,” which incorporates these recommendations, was developed and distributed by the FSF as a resource. These recommendations have been recognized internationally as tools for mitigating the risks of ALAs.

Despite past efforts, the Board found that the FSF recommendations are not being implemented into commercial operations.

**Slide 11 – SMS in Recent Investigations**

Here are three examples from TSB investigations that have involved SMS. The first bullet is from an ongoing investigation, so I cannot give any more specific details about it.

**Slide 12 – Safety Culture and SMS**

Aéropro

In another accident, a King Air—this time operated by Aéropro—crashed just after taking off from Quebec City in June of 2010, following a problem with the right engine. The aircraft was unable to maintain altitude and descended to the ground, where it ran into a berm, flipped over, and burned. The two pilots and five passengers onboard perished in the subsequent fire.

**Slide 13 – Causes and Contributing Factors (Aéropro)**

The Board found that the company’s poor safety culture contributed to the acceptance of unsafe practices. Among these was a requirement to take off with unapproved reduced power settings, to “save” wear and tear on the engines.

A company’s safety culture is demonstrated by its procedures and processes, behaviours by management and employees, and safety-related values and beliefs. A frequently cited definition of an organization’s “safety culture” is as follows:

“Shared values (what is important) and beliefs (how things work) that interact with an organization’s structures and control systems to produce behavioural norms (the way we do things around here) - Uttal (1983).”

I will leave you with a question: Can SMS work in an operation with a poor safety culture—and if not, what do we do about it?

**Slide 14 – Lightweight Flight Recording Systems**

In contrast to the record of the 702/703/704 world from 2001-2012, Canada’s large carriers operating under *Canadian Aviation Regulations* subpart 705 have had only one fatal accident on home soil: the 2011 crash of a Boeing 737 in Resolute Bay, NWT, and that investigation is still ongoing. Many 705 operators routinely download their flight data to conduct Flight Data Monitoring (FDM) of normal operations. Air carriers with flight data monitoring programs have used flight data to identify problems such as unstabilized approaches and rushed approaches, as well as other non-adherence to standard operating procedures.

Worldwide, FDM has proven to benefit safety by giving operators the tools to look carefully at individual flights, and ultimately at the operation of their fleets over time. This review of objective data, especially as an integral component of a company safety management system, has proven beneficial in the proactive identification and correction of safety deficiencies and the prevention of accidents.

Several stand-alone lightweight flight recording systems are currently being manufactured. These can record combined aircraft parametric data, cockpit audio data, airborne images and/or data-link messages. While performance standards and technical standard orders (TSOs) exist, there is no requirement for aircraft *not* governed by CARs 605.33 to be fitted with any type of flight recorder. (Note: the photograph on the slide is not necessarily the way to go!)

The development of lightweight flight recording system technology presents an opportunity to extend FDM approaches to smaller operations. Review of FDM information will allow operators to identify problems in their operations and initiate corrective actions—hopefully *before* an accident takes place. In short, a whole new and promising avenue is now available to improve operational control and safety for 702/703/704 operations.

**Slide 15 – “I’m Legal, but am I Safe?”**

I will conclude this morning by commenting on the newspaper articles on aviation safety which appeared in the Post Media newspapers last week, which some of you may have seen. The articles were well done and dealt with some of the key safety issues facing the industry.

One aspect of these articles seems to come up every time the media looks at our aviation safety system. This has to do with the call for more inspectors as the means to assure safety in aviation. I am of opinion that a return to cat-and-mouse games, the command and control between the regulator and the operators, will not yield the improvements that we need to take safety to the next level.

What we need instead is a more sophisticated approach. We need owners, operators, leaders and decision makers in the aviation industry saying: “You know what? Meeting the basic requirements is not good enough. We need to adopt *best* practices, we need to foster *better* safety cultures in our businesses, and we need to adopt Safety Management System approaches in our 703 and 704 operations—all without waiting for the regulator to *tell* us to do it.”

Besides, there are not enough inspectors in the world to supervise *every* aviation operation. And even if there were, such a system, as I said, would not lead to the kinds of improvements we need to see.

So let Transport Canada focus on those few operators that cut corners, and let Transport Canada put those who refuse to run a safe operation out of business, while *we* focus on how to provide an even safer aviation transportation system for Canada.

Thank you.

**Slide 16 – Questions**

**Slide 17 – Canada Wordmark**

1. *Canada Air Pilot* [↑](#footnote-ref-1)