



Moving Forward

Changing the safety and security culture

A strategic direction for safety and security management



TC-1002279



Message from the Minister



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Message from the Minister

I am pleased to present *Moving Forward – Changing the safety and security culture – A strategic direction for safety and security management*, which outlines the direction we must take to make progress on changing the safety and security culture. *Moving Forward* will guide us as we apply safety and security management in our day-to-day transportation activities.

Safety and security management requires that we change the way we all do business – from safety and security at the operations level to a systems-wide approach. To do this Transport Canada is building upon its existing regulatory frameworks and focusing on risk management practices. Transport Canada sees safety and security management systems as a big part of the solution.

The shift to managing safety and security represents a major cultural shift for many organizations. Managing safety and security means identifying and mitigating risks and threats before occurrences happen. Small problems are fixed before they turn into big ones. Isolated issues are explored to see if they are systemic. It is a shift from looking at components to managing the risks and threats of the system.

Many of the concepts presented in *Moving Forward* are not new. What is important to note is that different sectors of industry are in various phases of studying, adopting and implementing safety and security management systems. What is new is the recognition that what is required is a change – a cultural change – in the practices of everyone involved in transportation activities.


By working in partnership with transportation stakeholders towards our common goal of a safe, secure, efficient and sustainable transportation system, we can move forward together from vision to reality.



The Honourable Lawrence Cannon
Minister of Transport, Infrastructure and Communities

SAFETY & SECURITY

Foreword



How we manage risk— or what we do to prevent incidents and accidents from occurring in the first place and learning from them when they occur— becomes the logical and necessary focus of our endeavours.

Foreword

Transport Canada (TC) has adopted safety and security management to affect a cultural shift in the transportation system. TC recognizes cultural change is a long-term endeavour. This document outlines why a different approach is needed, the approach, what is to be achieved and how progress will be made. TC's strategic direction will focus on safety and security management and the systems designed to achieve a safety and security culture.

TC's regulatory oversight program is very diverse. It includes operators of many sizes, design organizations and manufacturers, shippers, and others. Applying a more comprehensive approach will require changes in the way both industry and TC address safety and security, including regulatory oversight. This will require a culture shift on the part of both industry and TC in adopting a new accountability framework for delivering on safety and security objectives.

There has been an evolution of safety and security practices in transportation over the last decade. Traditionally, we have addressed safety and security by prescribing through regulations and standards and ensuring compliance. Prescribing safety and security is becoming more difficult and more demanding of limited resources. As the transportation industry continues to mature and adapt to a dynamic context, to the complexity of technology, to increased operations and to globalization; there is a need to apply modern safety and security practices.

It is recognized among regulators that an entity can comply with regulations without effectively managing risks to acceptable levels. A more comprehensive approach, which includes systematically understanding and managing risks and threats in the system, will enable us to make progress on our safety and security objectives. Safety and security management systems (SMS/SeMS) are formal frameworks designed to integrate safety and security into the daily operations of a transportation enterprise. These systems combine a variety of processes that interact to achieve the overall goal of managing risks and threats.

Safe and secure are relative terms, based on the best practices and conditions of the day. Safety is not an absolute condition, neither is security. There will always be risks in transportation. How we manage risk – or what we do to prevent incidents and accidents from occurring in the first place; and what we learn from them when they occur – becomes the logical and necessary focus of our efforts.

SAFETY & SECURITY

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TC is building upon existing regulatory frameworks and focusing on risk management practices. Safety and security management systems (SMS/SeMS) are part of this solution.

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Context for change: why do we need a different approach?



The transportation system must address enormous safety and security changes.

It has become necessary to do more than prescribe and comply with safety and security requirements. TC and industry must manage risks/threats to acceptable levels.

Context for change: why do we need a different approach?

Transport Canada (TC) promotes the safety and security of Canada's transportation system. The aim of a safe and secure transportation system is to protect the country's citizens from events that result in the loss of or damage to life, health and property. It also enables the efficient flow of people and goods, protects the environment from pollution that can result from such events, and is an essential component for a healthy population, a high quality of life, and a prosperous economy. TC supports the safety and security objective through policy development, rule making, monitoring and enforcement, and outreach activities.

Safety and Security is comprised of:

- Aircraft Services
- Civil Aviation
- Marine Safety
- Marine Security¹
- Rail Safety
- Road Safety
- Security and Emergency Preparedness²
- Transport Dangerous Goods
- Rail and Urban Transit Security³

TC's activities differ in terms of the industry sectors regulated, the scope and authority of regulations, and their size. Highlights of their characteristics include:

- Each year more than 1,200 new and modified aeronautical products built or operated in Canada require approval. Annual sales of Canadian aerospace products and services are over \$20 billion, with exports of aerospace goods and services approaching \$17 billion.
- In 2000 over 40 million passengers and 17 million vehicles travelled by ship in Canada, representing over 15 percent of worldwide ferry traffic.
- Between 1996 and 2005, the number of carloads originating from Canadian railways increased from 3.0 million to 5.0 million – an increase of 67 percent.
- Canada has 22 million drivers; each driving an average of 16,000 km per year.

¹Herein referred to as Security.

²Herein referred to as Security.

³Herein referred to as Security.



- In 2006, the Canadian Air Transport Security Authority screened 39 million passengers and 60 million pieces of luggage.
- Approximately 8,300,000 commercially available chemicals are considered dangerous goods.

Despite noticeable differences within Safety and Security and the transportation sectors regulated – there are many common issues:

- Growth
- Globalization
- Threat of terrorism
- Continued potential for accidents and incidents
- Demographics, recruitment and retention issues
- Limited investment in infrastructure improvement
- Changing government agenda

TC is responsible for promoting safety and security by overseeing a diverse range of organizations and activities. Many common changes and challenges exist in the different modes and sectors.

The transportation system is becoming more integrated with increased expectations that cargo and passengers can move smoothly between modes (e.g. from ship to train to motor carrier) and across borders.

This affects the appropriateness of common safety and security promotion and oversight approaches to all modes and sectors. The similarities and differences of the changes and challenges outlined provide a complex and dynamic picture of the transportation system in Canada today. The traditional prescriptive approach to regulating operations is insufficient for addressing these changes and challenges affecting industry and TC.

Safety Changes and Challenges - Industry

The global environment continues to change and evolve. Dramatic growth of new markets (e.g. Asia-Pacific) is putting tremendous pressure on the transportation system in terms of productivity, capacity, supply, demand and safety. Bottlenecks are beginning to develop at key ports and there are concerns about the ability of Canada's rail and marine systems to meet current demands and future growth. Traffic levels are growing in all modes.

With the traffic growth predicted, the number of accidents could increase unless TC looks at different ways to improve safety and therefore reduce the rate of accidents.

The transportation system is becoming more integrated with increased expectations that cargo and passengers can move smoothly between modes (e.g. from ship to train to motor carrier) and across borders. Extensive advances in technology are affecting the safety of our transportation activities. Projected shortages of technical personnel in industry – coupled with the forecasted and real industry growth being observed – are putting significant pressure on organizations to optimize safety, security and productivity. In short, organizations have to do more work with less staff. These changes are creating challenges for the transportation industry to continue to meet the needs of Canadians.

Projected traffic growth may result in an unacceptable number of air accidents in Canada in the next few years. In recent years the rail industry has seen a larger than normal number of rail accidents. The marine industry in Canada has not seen a projected or real increase in accidents; however, industry growth is occurring. The road sector, which has the highest number of collisions and fatalities, has seen an increase in fatalities in 2005 after a long downward trend. With the traffic growth predicted, the number of accidents could increase unless TC looks at different ways to improve safety and therefore reduce the risk of accidents occurring.

Safety Changes and Challenges – Transport Canada

For a number of years, TC's role has been evolving from being an owner-operator of major portions of the transportation system, to providing policy and regulatory oversight. As a result, a greater share of responsibility for safety and security is being shifted to industry. In addition, the nature of the relationship between industry and TC is changing. How TC conducts its oversight programs must reflect these changes. There is a need for accountability frameworks that can be adapted to support the changing roles and responsibilities of both TC and industry.

The oversight of safety management will require traditional and new technical competencies. Statistics are projecting that 32 per cent of staff will be eligible for retirement by 2010 and over 50 per cent of technical staff will be eligible to retire between now and 2013. This provides a challenge and an opportunity for TC to recruit technical staff with both traditional and systems expertise.

The SMART regulation initiative supports regulations that are less prescriptive, more performance-based, developed transparently and harmonized with international partners. Risk management is being widely implemented in government activities. In addition, many modern management directives coming from central agencies are changing how government departments, such as TC, conduct business.

Advancements in safety research have shown that organizations can be compliant with prescriptive regulations yet still be unsafe⁴. These changes, challenges and opportunities are creating a need for TC to regulate smarter: risk-based interventions that address systemic concerns. The Government of Canada's approach to serving Canadians is changing. How TC conducts its programs must reflect these changes.



The nature of the relationship between industry and TC is changing. How TC conducts its oversight programs must reflect these changes.

Advancements in safety research have shown that organizations can be compliant with prescriptive regulations yet still be unsafe⁴. These changes, challenges and opportunities are creating a need for TC to regulate smarter: risk-based interventions that address systemic concerns.

⁴Benner, L. Jr. (1984). What Is This Thing Called A Safety Regulation? Journal of Safety Research, Vol.14, pp.139-143

Security Changes and Challenges - Industry

The threat of terrorism will remain part of our reality, with the transportation system one of its main targets.

The enhancement and assurance of a secure transportation system in Canada are critically important given recent high profile terrorist activity (e.g. Madrid and London bombings). The threat of terrorism will remain part of our reality, with the transportation system one of its main targets.

Technology is evolving at fast pace. Increasingly, advanced technology is used as a threat, as well as a means of detecting and responding to threats. The transportation system is at the core of Canada's trade and economy. Canada must take actions to ensure the confidence of the United States, our largest trading partner. Canada must strike the right balance between the need for enhanced security and the efficient movement of people and goods. These are the security changes and challenges facing Canada's transportation industry.

There is a need to make substantial human and financial investments today, to meet challenges over the next five years. There is a need to focus resources intelligently, based on threats and risks as they develop given the resource constraints that exist.

Security Changes and Challenges – Transport Canada

Security has become a TC priority as a result of international security efforts. Canada is playing a substantial role in the efforts to manage security threats through a variety of initiatives, embodied by *Securing an Open Society: Canada's National Security Policy*, *TC's Transportation Security Action Plan (TSAP)*, and the *Security and Prosperity Partnership (SPP)*.

The key challenge facing the security sector is to find innovative and cost-effective ways to identify and mitigate security threats in the transportation system while balancing environmental and economic needs.

The transportation sector is intricately linked across modes and regulated by multiple levels of government. TC has taken on an increasingly complex leadership role in recent years to support integrated and coordinated security regimes. There is a need to address security concerns identified by the modes (rail, urban transit, marine and aviation) and to collaborate with other government departments at all levels (international, national, provincial and municipal). The key challenge facing the security sector is to find innovative and cost-effective ways to identify and mitigate security threats in the transportation system while balancing environmental and economic needs.

Evolution of Safety and Security Practices

It is generally understood that transportation accidents and incidents result from a combination of factors - human, organizational, technical and environmental. It is also understood that these factors can best be mitigated at the organizational or system level – as was recommended following investigation into several recent high-profile transportation accidents in the marine, rail and air sectors. Accidents are best prevented when the underlying causal factors are mitigated. Security incidents are best prevented through identification and mitigation of security gaps and weaknesses. Making the system safer and more secure requires action: understanding hazards, risks, threats and events to identify and mitigate problems at the organizational or system level.



To maintain the viability of the transportation system, given the changes and challenges being experienced today, a new approach to safety and security is needed if we are to continue making progress.

Safety and security have traditionally been viewed as states (e.g. rail transportation is safe and secure). Over the past decade safety and security have been discussed in practical risk terms as conditions where risks/threats are managed to acceptable levels. Risk management has evolved over the past three decades and is now widely practiced in safety and security activities.

Advances in safety and security practices indicate that regulators need to build upon existing regulatory frameworks and focus on risk management practices. The transportation system needs to modernize the management of safety and security. Combining safety, security, management strategies and business strategies is the next generation safety/security program – designed to address organizational and system deficiencies in high-risk industries. Introducing safety management systems has been recommended to address the contributing and underlying factors in a number of recent, major transportation accidents.

Current thinking and research show that safety, efficiency and productivity are linked – safe operations are profitable operations. Accidents and security events cost the whole industry in both direct and indirect costs. Since the mid 1990s, safety management concepts have been used by the rail, petrochemical and nuclear power industries. These concepts have evolved from the more traditional quality and reliability programs associated with the process and manufacturing industries – to the safety and security management systems being applied to high-risk industries today.

Transport Canada's Strategic Direction: Safety and Security Management

The transportation system must address enormous safety and security changes. It has become necessary to do more than prescribe and comply with safety and security requirements. TC and industry must manage risks/threats to acceptable levels. Furthermore, TC and industry must commit to developing and maintaining a safety and security culture that continuously improves, learns, anticipates and becomes resilient to future changes and challenges.

It is generally understood that transportation accidents and incidents result from a combination of factors - human, organizational, technical and environmental. It is also understood that these factors can best be mitigated at the organizational or system level.

Advances in safety and security practices indicate that regulators need to build upon existing regulatory frameworks and focus on risk management practices. The transportation system needs to modernize the management of safety and security.

Transport Canada's approach to safety and security management

TC is committed to, and supports the use of, safety and security management throughout the transportation system. TC's policy is for industry to be accountable for systematically and proactively managing risks and threats within their transportation activities.

Transport Canada's approach to safety and security management

Safety and Security Management Policy

Safety and security management is based on the fact that there will always be hazards, risks and threats. Therefore, systematic and proactive management is needed to identify and control them before they lead to mishaps. TC is committed to, and supports the use of, safety and security management throughout the transportation system. TC's policy is for industry to be *accountable for systematically and proactively managing risks and threats within their transportation activities.*

TC recognizes that at the most basic level, the management of safety and security requires:

- Defining clear accountability and responsibility.
- Setting performance goals⁵ and actively pursuing them.
- Managing safety risks and security threats systematically and proactively, including continuous improvement and learning.
- Monitoring and evaluating performance towards goals⁵.

While the basic principles seem simple enough, implementing them – moving from concept to reality – is the challenge. The primary reason for these difficulties is that the new policy demands cultural changes.

TC has defined SMS/SeMS to be a *formalized framework for integrating safety/security into the daily operations of a transportation enterprise.* One way to conceptualize SMS/SeMS is in terms of three groups of strategies:

- Safety/security strategies focus on ensuring compliance and preventing and/or reducing harm arising out of a firm's decisions and operations.
- Management strategies focus on systematizing management functions and processes to enhance or optimize organizational performance.
- Business strategies focus on creating and capturing shareholder value.

The goal of these strategies is to systematically and proactively manage risks to acceptable levels. The goal is for SMS/SeMS to be integrated with all other management system components.

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⁵ Goals in this context is used generally to mean goals, targets, standards, results, etc.



To achieve the objective of the policy, where appropriate and practicable, TC:

- Requires safety and security management systems.
- Delegates safety and security management to industry by setting standards and results to be met.
- Encourages voluntary adoption of safety and security management principles and/or systems.
- Encourages continuous improvement and learning from experience.

In short, what is being changed is the accountability framework for managing risks/threats.

Application of Safety and Security Management

The application of safety and security management requires a new regulatory approach. TC is building upon existing regulatory frameworks and focusing on risk management practices. Safety and security management systems (SMS/SeMS) are part of this solution, which take a systems approach to managing risks/threats. A systems approach means considering how a change in one part of the organization affects another. For example, SMS/SeMS aim to break down barriers to communication – recognizing that the decisions or actions of any one part may have an impact on the safety/security of other parts. It is understood that a systems approach is one where the components (e.g. policies, procedures, practices, etc.) interact to create a whole that is greater than the sum of the parts.

Current TC SMS regulations form an overarching set of regulations. These new regulations work in concert with existing safety regulations to better manage the risks in transportation activities. In the past, TC intervened at the operational level. Under the new approach, TC (or a delegate) will audit and assess organizations at the organizational or system level, and be able to verify that day-to-day operations are compliant. When an operator is found to have a system problem or a day-to-day problem that is left unresolved or mitigated poorly, TC will intervene at the appropriate level. TC will maintain the capability to apply its traditional compliance inspection and audit activity while augmenting its capability to perform system audits and assessments. Security and Emergency Preparedness, Marine Security, and Rail and Urban Transit Security in collaboration with key stakeholders are examining the most efficient and effective way to adopt and implement security management and SeMS.

Given the diversity and complexity of the transportation system in Canada, regulating presents its own set of challenges. The extent to which each sector is regulated varies widely. For example, TC regulates all aspects of civil aviation safety; with the exception of some forms of recreational and sport activities – whereas TC regulates the manufacture and import of motor vehicles; but the provinces and territories have jurisdiction over vehicle registration, driver licensing, traffic laws, road geometrics and policy. Appendix A outlines the differences. As a result, the regulatory oversight approach must be tailored to appropriately manage the risks and threats specific to each area.

TC is building upon existing regulatory frameworks and focusing on risk management practices. Safety and security management systems (SMS/SeMS) are part of this solution.

TC will maintain the capability to apply its traditional compliance inspection and audit activity – while augmenting its capability to perform system audits and assessments.

There are a variety of ways to build upon our past efforts in safety and security. It is important to note that the different modes and transportation sectors are at different stages of study, adoption and implementation of safety and security management. Over the past few years, SMS have been applied to a variety of operational systems. The appropriateness of SMS/SeMS to some smaller operations⁶ and manufacturing activities in different transportation sectors is currently under study.

The principles of safety and security management can be applied differently depending on the nature of the organization and its transportation activities.

The principles of safety and security management can be applied differently depending on the nature of the organization and its transportation activities. The following diagram depicts three examples of approaches to safety and security management being implemented in different types of organizations regulated by TC. These approaches respect the differences, and at the same time maintain the core principles of safety and security management.

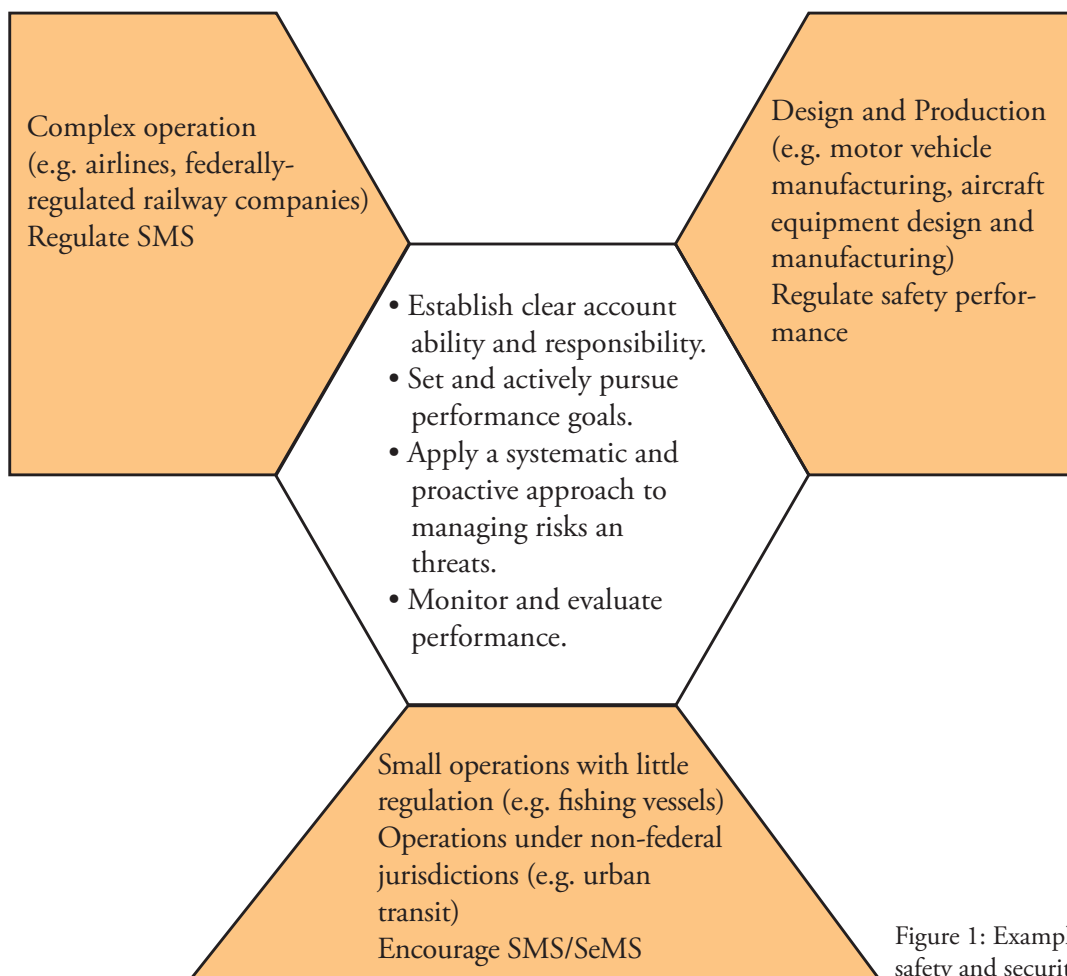


Figure 1: Examples of approaches to safety and security management

⁶ This diagram provides some examples; it does not preclude other approaches. For example, The the Rail Safety Management System regulations apply to all federally regulated railway companies regardless of size. Please see Appendix A for more details.

For many complex operations, TC requires SMS. Some of the components of formal SMS/SeMS frameworks include:

- Management Accountability
- Senior Management Commitment
- Employee Involvement
- Safety/Security Policy
- Safety/Security Information
- Safety/Security as a Core Value
- Setting Safety/Security Goals
- Hazard Identification and Risk Management
- Safety/Security Reporting System
- Safety/Security Audit/Assessment
- Accident and Incident Reporting and Investigation
- Safety/Security Orientation and Recurrent Training
- Emergency Response Plan
- Documentation
- Quality Assurance



Complex operations need to do more than implement the component pieces of SMS/SeMS; they need to integrate and interrelate the component pieces completely into the organization for the system to achieve the desired results. The system benefits come from the interaction and dependencies of the component pieces.

For some design, production and manufacturing activities, TC is approaching the management of safety and security by the regulation and delegation of safety and security performance. These are formalized safety and security performance requirements that set defined standards for performance. They require systematic frameworks for integrating safety and security into the design, development and production/manufacturing of the products. These organizations typically have formal risk management and reliability engineering frameworks on which to build the capability to meet safety and security performance requirements.

The principles of safety and security management can be applied differently depending on the nature of the organization and its transportation activities.

For some small highly regulated operations such as small rail and aviation organizations, TC supports SMS/SeMS appropriate to their size, scope and complexity. In other small operations that are less regulated (e.g. small fishing vessels) or are under other or multiple jurisdictions (urban transit), TC is encouraging voluntary adoption of Safety and Security management principles or components at this time. TC is studying the appropriateness and feasibility of SMS/SeMS to other small operations such as those prevalent in the trucking industry.

Some international harmonization efforts are requiring the introduction of SMS/SeMS (e.g. International Maritime Organization, International Civil Aviation Organization). Other international harmonization efforts require prescriptive and performance-based standards (e.g. Transport Dangerous

Goods United Nations group). In some cases, the early adoption of SMS provided leverage for a Canadian-made solution (e.g. International Civil Aviation Organization). International harmonization issues must be considered when determining the appropriateness of SMS/SeMS.

SMS and SeMS share many core principles and elements, as they are both system approaches to managing risks/threats. Important differences exist which prevent a simple transfer of concepts. The key difference is that safety is concerned with accidental or unintentional losses while security is concerned with planned or intentional losses. Similarities between SMS and SeMS can facilitate extensive integration of the two systems where they both exist in an organization, and permit the use of an existing SMS as the foundation for SeMS.

This approach recognizes the need to tailor the system requirements to the nature, size, scope and complexity of the sector and/or operation. The goal is to manage the specific risks and threats while respecting the challenges and opportunities that are different to the different modes. Appendix A provides a summary of the approaches to SMS/SeMS being examined and implemented.

The goal is to manage the specific risks and threats while respecting the challenges and opportunities that are different to the different modes.

What we plan to achieve: a change in safety and security culture

A safe and secure transportation system that contributes to Canada's social developments and security objectives.



What we plan to achieve: a change in safety and security culture

The safety and security management umbrella policy is designed to address the current and future changes and challenges affecting the transportation system. Implementing the safety and security management policy contributes to TC's strategic outcome for:

A safe and secure transportation system that contributes to Canada's social developments and security objectives.

Through this policy we want to develop and sustain a strong safety and security culture where:

- Management is accountable and responsible for safety/security.
- Everyone in the organization takes an active role in safety/security.
- Activities are risk-based.
- Organizations focus on systemic causes.
- Investment is made in proactive activities.
- Performance is measured.
- The system is audited.
- Safe and secure practices, continuous learning and improvement are the norm, even during times of high or low workload, financial pressure and labour pressure.

TC, industry and other stakeholders will work to develop and sustain the safety and security culture whereby people at all levels of the transportation system actively manage risks and threats in their day-to-day activities. While pockets of excellence exist both within industry and TC, this approach represents a major cultural shift – and will require substantial effort and time to be realized.

In simple terms, an organization's culture is demonstrated by what people do; decisions, actions and behaviour tell us something about the values of the organization. Some of the practices that define a safe and secure culture are:

- Employee involvement.
- Reporting hazards, threats and events.
- Sharing safety and security information.
- Analysing contributing and underlying factors of hazards, threats and events.
- Making risk-based decisions and mitigating identified risks.
- Considering the impact on safety and security performance of every decision taken no matter where in the enterprise.
- Achieving continuous improvement and innovation.



It is recognized that these practices must be integrated within industry and TC's day-to-day activities. This too will require substantial effort and time.

The overall goal is for safe and secure practices to be demonstrated and reflected in all activities, at all organizational levels, in everyday work. A safe and secure culture is one where:

As these practices and behaviours become 'the way we do business around here' the organization will sustain and nurture a safety and security culture where continuous improvement and learning are fundamental.

- Past experience is not taken as a guarantee of future success.
- Open communication is encouraged.
- Employees are involved.
- Practices and procedures are regularly compared, reviewed and improved.
- Human errors are treated as symptoms not consequences.
- Organizations are designed to be resilient to unplanned events.
- Discussions about risk continue despite everything looking safe and secure.
- Awareness and consideration of the external security environment is ongoing.
- Organizations encourage fresh perspectives.
- Investment in safety and security is made even in times of financial constraint.
- Regulator and industry work together to make the system safer and more secure.

Safety and security culture is a complex concept. This definition is not exhaustive. Rather it highlights key practices and behaviours to be developed and sustained. As these practices and behaviours become '*the way we do business around here*' the organization will sustain and nurture a safety and security culture where continuous improvement and learning are fundamental.

TC recognizes that it is not only industry's safety and security culture that must evolve; TC must also continuously learn and develop. All players and participants in the transportation system must actively work together to create safety and security if we are to manage the dynamic, increasingly complex and integrated nature of the transportation system.

In addition to developing and sustaining a safety and security culture, SMS/SeMS may bring other benefits. Many organizations have already adopted SMS/SeMS and realized benefits such as:

- Increased direct and indirect cost savings due to accidents/losses prevented and reduced insurance premiums. Skyservice Airlines, Air Transat, Conair, Harbour Air, and Moncton Flight College are a handful of aviation companies who have publicly demonstrated the benefits of SMS to their economic performance (2006, TC Civil Aviation SMS Information Session Vancouver; 2005, TC Civil Aviation SMS Information Session Toronto).
- Increased competitive advantage in aviation and domestic marine shipping sectors.
- Demonstrated due diligence when accidents do occur (Bill C-45).
- Improved communications, morale and productivity.
- Reduced oversight, therefore risk-based use of resources.
- Increased management of safety and security by those who can have the greatest positive impact.
- Improved relationships and partnerships (e.g. industry collaboration and information sharing).
- Increased collaboration between stakeholders on safety and security initiatives to mitigate risk, especially in security and emergency preparedness activities.

TC recognizes that it is not only industry's safety and security culture that must evolve; TC must also continuously learn and develop.

Challenges and strategies: how we will make progress



TC'S REGULATORY
OVERSIGHT PROGRAM

CANADA



Challenges and strategies: how we will make progress

The transition to safety and security management presents a variety of current and future challenges to industry and TC. Six key challenges that affect the transportation system will be best addressed through multi-modal, industry/TC collaborative strategies and actions.

This section describes each challenge, objectives to meet the challenge and ways to measure progress. These strategies will help TC transition from a traditional regulatory program to one where risks/threats are managed to acceptable levels.

Included in Appendix A is a summary of each directorate's challenges and strategies for transitioning to safety and security management.

Challenge 1

Demonstrate the impact of safety and security management.

Industry and TC must demonstrate the impact of implementing safety and security management. TC is committed to upholding and demonstrating the principles of good governance: accountability, transparency and results-based programs. The long-term objective is to continuously improve the high level of safety and security in Canada and to achieve a high level of confidence in our safety and security strategies.

What we plan to achieve	How	How we will know we are making progress
Understand and commit to safety and security management.	Share lessons learned, best practices and industry examples in a multi-modal forum such as a conference, newsletter, website or other medium.	Gauge feedback to multi-modal forum.
Track and monitor progress.	Survey and study trends looking at indicators of success.	Measure, for example: confidence, compliance statistics, system assessment/audit statistics, incident and accident frequencies, lost-time injuries, impact and outcomes of pilot projects, safety/security and business cases, etc.

Challenge 2

Shift accountability and responsibility for safety and security.

Traditionally it was perceived that TC assumed accountability and responsibility for safety and security performance because of its inspection, audit and enforcement activities. With advances in our understanding of risk management and the changes and challenges facing the transportation system, industry and TC must work together to manage risks/threats to acceptable levels. The challenge is for industry to increase its accountability and responsibility for its safety and security performance.

What we plan to achieve	How	How we will know we are making progress
Clarify the shift in accountability and responsibility.	Define and communicate the shift in accountability and responsibility. Communicate <i>Moving Forward</i> and other communications widely (multi-modal conference, web, newsletters, etc.).	Achieve consistency in explaining and understanding the shift in accountability and responsibility to industry and within TC.
Shift perceived and real accountability and responsibility for safety and security to industry.	Implement SMS/SeMS as a cornerstone of regulatory oversight programs where appropriate. Encourage the principles of safety and security management where appropriate.	Track implementation of SMS/SeMS where appropriate and track adoption of principles of SMS/SeMS where appropriate.

Challenge 3

Understand and apply risk management in day-to-day activities.

All employees at all organizational levels (within industry and TC) must understand and apply risk management in day-to-day activities. Risk management forms the basis of safety and security management. To actively participate and contribute to the effectiveness of safety and security management, all employees must have this understanding and ability. The long-term objective is for risk management to be a normal work practice both in industry and TC.

What we plan to achieve	How	How we will know we are making progress
Understand the principles of risk management.	Provide internal multi-modal training in risk management concepts and principles. Make materials freely available to industry.	Evaluate effectiveness of risk management training.
	Plan and implement a briefing campaign on risk management.	Survey industry on the usefulness of the campaign.
Apply risk management in day-to-day activities.	Document a risk management policy where appropriate.	Monitor progress on directorate risk profiles and impact of risk mitigation activities.
	Provide risk management tools and templates. Make materials freely available to industry.	Evaluate effectiveness of risk management tools and templates through survey methods.
	Provide internal multi-modal training on risk management tools and templates. Make materials freely available to industry.	Evaluate effectiveness of risk management training.

Challenge 4

Develop capability and capacity to deliver (industry) and provide oversight for (TC) safety and security management (where appropriate).

The industry varies widely in its ability to implement SMS/SeMS or activities to support the principles of safety and security management. The challenge is to develop the capability and capacity in industry to deliver these systems/activities. Resulting from this challenge is another for TC to develop the capability and capacity to provide oversight for these systems/activities.

What we plan to achieve	How	How we know we are progressing
Define 'where appropriate' with respect to implementing SMS/SeMS requirements.	Provide guidance on the definition and implementation of 'where appropriate'.	Implement and regularly review the guidance to adjust to changes and development.
Define clear strategies to address multi-modal challenges and issues.	Draft <i>Moving Forward</i> .	Publish <i>Moving Forward</i>
	Update the multi-modal challenges and strategies section of <i>Moving Forward</i> annually.	Assess annual progress on strategies.
Define clear vision and consistent definition of SMS/SeMS across all modes.	Communicate <i>Moving Forward</i> .	Conduct multi-modal surveys of industry representatives and inspectors.
Identify challenging areas of SMS/SeMS delivery and work with industry to develop strategies to address these challenges.	Work with industry to identify and make available tools to assist in the delivery and oversight of SMS/SeMS.	Survey industry on the usefulness of SMS/SeMS tools and survey inspectors on the usefulness of SMS/SeMS oversight tools.
	Work with industry to identify and use safety and security performance objectives, targets, goals, results and indicators.	Verify that this component is being implemented effectively – through SMS/SeMS audits, assessments and other activities.
	Research and develop system audit and system evaluation methods for use by both the regulator and industry.	Relate system audit and evaluation results to impact of SMS/SeMS implementation results.

Manage the public's expectations surrounding safety and security management.	Communicate <i>Moving Forward</i> .	Survey public awareness, understanding and confidence.
Develop capacity/resources to deliver SMS/SeMS or provide oversight.	Review the experience of others, conduct pilot projects, survey those in the process of developing SMS/SeMS in a variety of settings and provide guidance.	Compare the current resources to the number needed in a variety of SMS/SeMS settings for implementation and maintenance.
Develop common conceptual knowledge of key principles to assist in providing oversight given new requirements.	Provide internal multi-modal training (e.g. concepts and principles in risk management, safety and security management systems, human factors, system auditing, etc.).	Evaluate effectiveness of SMS/SeMS oversight training.

Challenge 5

Practice safety and security management activities

A challenge for both industry and TC is the integration of safety and security management activities into day-to-day practice. This challenge refers to getting all participants to actively perform safety and security management activities (e.g. report hazards, practice emergency response drills, measure performance, risk management, which includes threat-risk-vulnerability assessments, etc.). For TC, this challenge means integrating modern management practices into day-to-day practice. Integrated Management System (IMS) and Quality Management System (QMS) are two of the frameworks being applied by TC in different directorates to address this challenge.

What we plan to achieve	How	How we know we are progressing
Integrate the management of risks/threats into day-to-day activities.	Develop and implement policies and procedures regarding SMS/SeMS (e.g. reporting, risk-based decision-making, hazard analysis, system auditing, etc.).	Study gap between procedures and practices and adjust where necessary.
	Define, encourage and reward expected behaviours.	Conduct internal system audit and evaluate use of risk-based decision-making by managers.
Learn from and continuously improve our system.	Study ideas with the potential to improve SMS/SeMS.	Evaluate usefulness of new approaches in practice by reviewing pilot projects or industry best practices.
	Build corporate knowledge on lessons learned and share them widely.	Verify regular review of corporate documentation.

Challenge 6

Plan and invest resources in proactive activities.

High-risk industries have a tradition of being reactive. Efforts to improve the system often stem from failure. A proactive approach means finding ways to improve the system without a failure. Failures have costs in terms of human life, property damage, insurance costs, etc. A proactive approach aims to prevent failures before they happen. The challenge is to invest time and resources in proactive work. The long-term objective is for more proactive work to be conducted than reactive work – and prevent failures.

What we plan to achieve	How	How we know we are progressing
Plan and resource proactive work.	Identify, plan and resource proactive projects addressing hazards and threats.	Evaluate impact of risks mitigated.
	Encourage investing and resourcing proactive projects that address hazards and threats (Industry and TC senior management).	Compare resource distribution of proactive, reactive, and operational activities at regular intervals.
	Share case studies in industry/TC forums.	Evaluate relevance and usefulness of the multi-modal forum.

Conclusion

TC is adopting safety and security management as the primary means for addressing the current and future changes and challenges that face the Canadian transportation system. Safety and security management is principally about:

- Defining clear accountability and responsibility.
- Setting performance goals and actively pursuing these goals.
- Systematically and proactively managing safety risks and security, threats, including continuous improvement and learning.
- Monitoring and evaluating performance towards goals.

SMS/SeMS are formal frameworks for integrating safety/security into the day-to-day operations of a transportation enterprise. TC requires, where appropriate, the adoption of the principles of safety and security management and SMS/SeMS.

TC is committed to partnering with industry and other stakeholders to transform the safety and security culture to one where safe and secure practices are the norm – and where risk management is practiced in day-to-day activities at all levels of the organization. By transforming our safety and security culture, we can make progress on our safety and security objectives, continuously learn and make system improvements.

A number of challenges, both general and specific, must be faced in order to achieve our objectives. A variety of strategies are being – and will continue to be – implemented to address the challenges brought about by this different approach.

Safety and security management has the potential to enable the transportation system to adapt and grow with current and future changes and challenges. By implementing a risk management philosophy, we hope to achieve our safety and security objectives and continuously improve the safety and security of our transportation system.

TC is committed to partnering with industry and other stakeholders to transform the safety and security culture to one where safe and secure practices are the norm – and where risk management is practiced in day-to-day activities at all levels of the organization.



Safety and security management has the potential to enable the transportation system to adapt and grow with current and future changes and challenges.

Appendix A

Appendix A: SMS/SeMS in each directorate

Civil Aviation	Rail Safety	Marine Safety	Road Safety
<p>Five major sectors:</p> <p>Aeronautical Product Design and Manufacturing:</p> <ul style="list-style-type: none"> - Each year, more than 1,200 new and modified aeronautical products built or operated in Canada require approval - Annual sales of Canadian aerospace products and services are over \$20 billion, with exports of aerospace goods and services approaching \$17 billion <p>Air Operations:</p> <ul style="list-style-type: none"> - Second largest civil aviation aircraft fleet in the world <p>Aircraft Maintenance:</p> <ul style="list-style-type: none"> - Products range from aeronautical product overhaul and maintenance, to training programs with more than 14,000 aircraft maintenance engineers (AME) <p>Aerodrome Operations:</p> <ul style="list-style-type: none"> - Of the thousands of aerodromes and airports in Canada, there are over 600 certified airports and 1,000 registered aerodromes <p>Air Navigation System:</p> <ul style="list-style-type: none"> - NAV CANADA is a not-for-profit private company that assumed responsibility for virtually all of Canada's civil air navigation system in November 1996 - Other civil air navigation service providers are Serco, and approximately 200 private companies and individuals 	<p>Responsible for oversight of the rail industry. Most provinces with provincial railways have signed agreements with Transport Canada to deliver inspections for compliance to applicable rules, regulations and standards.</p> <ul style="list-style-type: none"> - There are approximately 90 provincial and federal railways currently operating in Canada. - In the last decade (1996-2005) the number of railway employees has declined from 47,700 to 35,000; however, the number of carloads originating from Canadian railways has increased from 3.0 million to 5.0 million — an increase of 67% - Although the Canadian-based railways own 100,600 freight cars and 3,000 locomotives, there are many other freight cars circulating in Canada - There are 585 passenger cars in service, carrying 4.0 million passengers annually - There are currently 42,000 km of owned main-track with approximately 49,000 highway-rail grade crossings <p>Current Issues:</p> <ul style="list-style-type: none"> - Changes in railway industry (more, new railways) 	<p>Federal regulations affect the following aspects of the marine industry in Canada: international and domestic shipping, passenger vessels, oversee training programs for officers and crews of commercial vessels; pleasure craft operator competency requirements; responding to marine occupational health and safety issues; maintaining a Canadian ship registry; protection and safety of marine navigation and the protection of marine environment in Canadian waterways; licensing small commercial vessels and pleasure craft; and overseeing pilotage matters.</p> <ul style="list-style-type: none"> - Canada is home to the largest inland waterway open to ocean shipping - In 2000, over 40 million passengers and 17 million vehicles travelled by ship in Canada, representing over 15 percent of worldwide ferry traffic - Marine is the dominant mode of overseas trade, with annual shipments in excess of \$100 billion - Over 75,000 small commercial vessels ply our waters - In 2001, the Canadian marine transportation 	<p>Responsibility for road safety initiatives is shared between the federal and provincial/territorial levels of government. The federal government, through the <i>Motor Vehicle Safety Act</i>, is responsible for the safety performance of all new and imported vehicles. It is also responsible through its <i>Motor Vehicle Transport Act</i> for the safe operation of extra-provincial trucking and busing. In addition, it provides national leadership by coordinating the collection and analysis of national traffic collision data, and through research, road safety program development and evaluation, and knowledge transfer.</p> <p>It is important to note that the provincial and territorial governments have direct jurisdiction over road infrastructure and traffic signage, driver licensing, vehicle registration, commercial vehicle inspection, traffic laws and enforcement/policing.</p> <ul style="list-style-type: none"> - 19 million registered vehicles - 22 million drivers each driving an average of 16,000 km per year - 279,000 heavy trucks and 325,000 medium-sized trucks - 60% of Canada -U.S. trade moved by truck

TDG	Security	Aircraft Services
<p>The Transport Dangerous Goods (TDG) directorate regulates the transportation of dangerous goods by air, marine, rail and road. Federal and provincial legislation provide for the regulation of an extensive list of products, substances or organisms classified as dangerous. The TDG program focuses on the oversight of shipping, classification, containment of dangerous goods being transported, and emergency response to accidents involving dangerous goods. It is important to note TDG does not regulate the producers of dangerous goods.</p> <ul style="list-style-type: none"> - Approximately 8,300,000 commercially available chemicals are included as dangerous goods - 2,500 groups of dangerous goods - There are approximately 30,000,000 dangerous goods shipments annually in Canada - Approximately 39% (tonnage) of dangerous goods shipments are transported by rail (45% by road, 15% by marine, less than 1% by air) <p>Current Issues: SMS has not been formally adopted by TDG because of:</p> <ul style="list-style-type: none"> - The very low dangerous goods accident rate. - Three key modes (rail, air, and marine) have formal 	<p>Transport Canada is responsible for the security and emergency preparedness of the Canadian transportation system and plays a lead role in the secure movement of people and goods. The department discharges that responsibility through activities such as establishing security rules and standards for transportation facilities, screening air travellers and their baggage, responding to security incidents and threats, and ensuring that emergency/security plans exist and are exercised. Transport Canada also regulates the Canadian Air Transport Security Authority (CATSA), a Crown corporation responsible for the screening of passengers and their belongings and certain other specific initiatives to improve air passenger and airport security.</p> <p>Current Issues:</p> <ul style="list-style-type: none"> - Current terrorist focus on transportation systems in other countries - Growing evidence of terrorist interest and presence in Canada - Enhancement and assurance of a secure transportation system in this country is critically important - There are multiple jurisdictions and regulatory approaches to security 	<p>Internal provider of aviation services to a variety of clients, government departments and agencies.</p> <p>Key activities:</p> <ul style="list-style-type: none"> - TC training and competency checks, transportation, inspection and surveillance - Canadian Coast Guard transportation, construction, ice reconnaissance, Arctic resupply, marine navigation aids and search and rescue - Surveillance <p>Current Issues:</p> <ul style="list-style-type: none"> - Canadian Aviation Regulations CAR 107 general, CAR 704/703, CAR 573 Maintenance required by December 2007 - Senior management recognized that with or without SMS regulations, Aircraft Services would need a more systematic way of managing risks

Civil Aviation	Rail Safety	Marine Safety	Road Safety
<p>Current Issues:</p> <ul style="list-style-type: none"> - Need to lower the accident rate - Majority of today's accidents attributed to human and organizational factors - Little opportunity for technological solutions to the types of accidents - Increase in traffic requires a proactive approach - Government drivers – need to maintain equivalent safety while managing demographics, retirements; need innovative approaches 	<ul style="list-style-type: none"> - Concerns raised by derailments (mid-90's significant accidents with fatalities) - Evolution of the TC compliance monitoring approach – from transactional/inspection shift to audit process and procedures (i.e. implementation onus on companies) - Recommendations to amend the <i>Railway Safety Act</i> 	<p>sector directly employed more than 25,000 people</p> <p>Current Issues:</p> <ul style="list-style-type: none"> - International harmonization - Large marine accidents with organizational causes receiving international attention - To lower the accident rate - Majority of today's accidents can be attributed to human and organizational factors - There is little opportunity for technological solutions to the types of accidents occurring 	<p>totalling \$349.4 billion (exports \$184.8 billion and imports \$164.6 billion)</p> <p>Current Issues:</p> <ul style="list-style-type: none"> - Most vehicle safety standards, compliance regime and motor carrier safety regime are harmonized with the U.S. - Current MVSA precludes applying certain SMS principles - Provincial/territorial jurisdiction over significant facets of road safety - After years of decline, 2005 fatalities increased 7%

TDG	Security	Aircraft Services
<p>SMS requirements</p> <ul style="list-style-type: none"> - Performance-based regulations and standards, where appropriate, already exist - Existing SMS components that are already in place - International harmonization efforts have focused on prescriptive and performance-based requirements concerned with the classification and containment of goods 	<p>among the various modes and sectors</p> <ul style="list-style-type: none"> - Several other governments and organizations are also very interested in SeMS and some transportation organizations are developing such systems. For example, the International Air Transport Association (IATA) now requires its members to have a version of SeMS - There is a need for organizations to integrate and manage security risks in a holistic and systematic manner, with better results at less cost for government and the private sector over time - Need ability to respond quickly, effectively and efficiently to dynamic and unique threat environments. - Changes to regulations, where they exist are not always the most desirable and effective response 	

Civil Aviation	Rail Safety	Marine Safety	Road Safety
<p>Definition of SMS – A documented process for managing risks that integrates operations and technical systems with the management of financial and human resources to ensure aviation safety or the safety of the public.</p> <p>SMS applies:</p> <ul style="list-style-type: none"> - Certification, Maintenance and Manufacturing industries, Commercial and Business aviation (e.g. Air Canada, Air Transat), Airports, Air Navigation Services <p>Limitations:</p> <ul style="list-style-type: none"> - SMS regulations will not apply to distributors, approved training organizations - SMS for private operators (CAR 604) will be addressed through the Canadian Business Aircraft Association 	<p>Definition of SMS - A formal framework for integrating safety into day-to-day railway operations including safety goals and performance targets, risk assessments, responsibilities and authorities, rules and procedures, monitoring and evaluation processes.</p> <p>SMS applies:</p> <ul style="list-style-type: none"> - Requires all federally regulated railway companies (including some provincial short lines where adopted provincially) to implement and maintain an SMS with mandatory components as outlined in the regulations 	<p>Definition of SMS - As per International Management of Safety Code. “The Crewing Regulations require that:</p> <p>‘21.1(1) The owner of a ship shall provide to the master written instruction that set out the policies and procedures to be followed to ensure that the complement of the ship</p> <p>(a) is familiarized with the ship and their duties; and</p> <p>(b) can effectively co-ordinate their activities when performing duties vital to safety or the prevention or mitigation of pollution.</p> <p>(2) The master shall ensure that the ship’s complement is trained in and carries out the policies and procedures’</p> <p>This can at the most fundamental level be interpreted to require some of the most important elements of a Safety Management System without calling it a Safety Management System.”</p> <p>SMS applies:</p> <ul style="list-style-type: none"> - Incorporated into the regulations in 2002 and applies to all vessels other than pleasure craft <p>Limitations:</p> <ul style="list-style-type: none"> - SMS requirements were implemented on a worldwide basis in 1998 for almost all tankers, bulk carriers and passenger ships in international trade and expanded to apply to general cargo vessels and offshore drilling units in 2002 - No domestic requirements but voluntary adoption promoted - Pockets of voluntary adoption, many of the larger operators BC Ferries, Marine Atlantic and larger bulk carriers have adopted International Safety Management Code for their purely domestic operations 	<p>There are three facets:</p> <ul style="list-style-type: none"> - Motor Vehicle Safety No explicit definition of SMS. SMS principles are embodied in the <i>Motor Vehicle Safety Act</i> (MVSA) “self-certification” and Notice of Defect approaches - Motor Carrier Safety No definition of SMS, but some SMS principles embodied in the National Safety Code, under the <i>Motor Vehicle Transport Act</i> (MVTA) - Road Safety: Definition of “safe systems approach” being jointly developed at international level for use in national programs <p>SMS principles apply:</p> <ul style="list-style-type: none"> - Motor Vehicle Safety: MVSA regulates the manufacture and importation of vehicles and vehicle equipment and covers all domestic manufacturers and importers (approx. 4,500 companies)

TDG	Security	Aircraft Services
<p>No explicit definitions of SMS, but SMS principles are embodied in the actual workings in the directorate (e.g. risk management, emergency response plans, documentation, industry accountability, prosecutions of companies only and not individuals, performance-based regulations and standards, where appropriate).</p> <p>SMS principles apply:</p> <ul style="list-style-type: none"> - TDG Act, Regulations and Standards cover the transportation of all dangerous goods - TDG sets the requirements and process for the classification of dangerous good, design and manufacture of means of containment, selection of containment, containment, shipping, documentation markings of the container, and emergency response when necessary <p>Limitation:</p> <ul style="list-style-type: none"> - Operation of the vehicle while transporting the dangerous goods is under the jurisdiction of the appropriate mode while shipping; containment, marking and emergency response when necessary fall within the TDG regulations and standards 	<p>Definition of SeMS - An integral part of an organization's day-to-day business operations and its management systems. It is used to implement the organization's security policy and to fulfill any regulatory requirements while effectively and efficiently managing security risks, threats and impacts in the context of an enterprise risk management framework.</p> <p>SeMS being considered for:</p> <ul style="list-style-type: none"> - Aviation, Marine and Rail/ Transit security groups <p>Limitations:</p> <ul style="list-style-type: none"> - Trucking not included by SeMS at this time - Multiple jurisdiction issues: non-federal railways and transit 	<p>SMS - As per CAR 107: A documented process for managing risks that integrates operations and technical systems with the management of financial and human resources to ensure aviation safety or the safety of the public.</p> <p>SMS applies:</p> <ul style="list-style-type: none"> - Not only those areas required by regulation (maintenance and flight operations) but throughout the organization, fully integrated into all aspects of the organization

Civil Aviation	Rail Safety	Marine Safety	Road Safety
<ul style="list-style-type: none"> - A safety policy on which the system is based - A process for setting goals for the improvement of aviation safety and for measuring the attainment of those goals - A process for identifying hazards to aviation safety and for evaluating and managing the associated risks - A process for ensuring that personnel are trained and competent to perform their duties - A process for the internal reporting and analyzing of hazards, incidents and accidents and for taking corrective actions to prevent their recurrence - A document containing all safety management system processes and a process for making personnel aware of their responsibilities with respect to them - A process for conducting periodic reviews or audits of the safety management system and reviews or audits for cause of the safety management system and - Any additional requirements for the safety management system that are prescribed under these Regulations 	<ul style="list-style-type: none"> - Safety policy, annual safety targets and associated safety initiatives - Safety authorities, responsibilities and accountabilities - Employee and representative involvement - Compliance with applicable regulations, rules, standards and orders - Risk management process - Risk control strategies - Accident and incident reporting, Investigation and analysis - Skills, training and supervision - Safety performance data collection and analysis - Safety audit and evaluation - Corrective action and development, approval and monitoring - Documentation 	<ul style="list-style-type: none"> - International Safety Management Code (IMO, 1993) - Safety and environmental protection policy - Compliance with relevant legislation - Defined levels of authority - Reporting accidents and non-conformities - Emergency response - Internal audits and management reviews 	<p>Motor Vehicle Safety</p> <ul style="list-style-type: none"> - Self-certification by manufacturers - Notice of defect by manufacturers - Record-keeping by manufacturers - Compliance audit of records, supplemented by testing of selected sample of vehicles by TC - Public safety complaint investigation, collision trend analysis and vehicle recalls - Education and outreach, in particular to smaller companies <p>Motor Carrier Safety</p> <ul style="list-style-type: none"> - Provincial/territorial enforcement - Risk-based audits, inspections - Driver logs must be kept - TC establishes performance criteria via <i>Motor Vehicle Transport Act</i> and National Safety Code - Provinces/territories enforce performance criteria (TC manages contribution agreement for delegated enforcement) <p>Road Use / Vehicle and Driver Licensing</p> <ul style="list-style-type: none"> - Risk-based targets under <i>Road Safety Vision 2010</i>

	TDG	Security	Aircraft Services
		<ul style="list-style-type: none"> - Management commitment and leadership, accountable executive - Security policy - Employee participation - External partnerships - Plan: security objectives, targets, programs, initiatives and plans; organizational structure, roles, responsibilities and authorities, human and financial resources, equipment and infrastructure; Threat-Risk-Vulnerability assessment and management - Do: Communication; operational control, information/knowledge management - Check: Legal, regulatory and other requirements compliance; security related failures, incidents and non-conformance investigations, root-cause analysis, review, performance measurement, analysis and corrective and preventative actions - Act: Management of change and continual improvement 	<ul style="list-style-type: none"> - A safety policy on which the system is based - A process for setting goals for the improvement of aviation safety and for measuring the attainment of those goals - A process for identifying hazards to aviation safety and for evaluating and managing the associated risks - A process for ensuring that personnel are trained and competent to perform their duties - A process for the internal reporting and analyzing of hazards, incidents and accidents and for taking corrective actions to prevent their recurrence - A document containing all safety management system processes and a process for making personnel aware of their responsibilities with respect to them - A process for conducting periodic reviews or audits of the safety management system and reviews or audits for cause of the safety management system - Any additional requirements for the safety management system that are prescribed under these Regulations

Civil Aviation	Rail Safety	Marine Safety	Road Safety
<p>Current Regulations:</p> <ul style="list-style-type: none"> - 2000 - present: Development of 17 Notice of Proposed Amendments and changes to the <i>Aeronautics Act</i> - Transport Canada's vision is that SMS will be implemented in all regulated civil aviation organizations by 2010 - However, SMS implementation depends on the date regulations come into force and following which will be phased in over three years - 2007-2009: manufacturing 2007, airports and ANS providers 2007, certification 2009 <p>Approach:</p> <ul style="list-style-type: none"> - Risk-based progressive development and Civil Aviation - Phased-in approach to implementation facilitated through exemptions and tailored to meet sector-specific needs. For example, for airline operators regulated under Canadian Aviation Regulation 705 and associated Approved Maintenance Organizations (AMOs), the phased-in implementation comprises four phases extending over three years and 120 days - For others, the phased-in approach will be tailored to meet specific sector needs <p>Status:</p> <ul style="list-style-type: none"> - Legislative and regulatory changes are still to be enacted with an estimated effective date of 2008 - 2010 full implementation 	<p>Current Regulations:</p> <ul style="list-style-type: none"> - SMS Regulations came into effect on March 31, 2001 <p>Approach:</p> <ul style="list-style-type: none"> - Loss Prevention Theory: Losses are the consequence of interaction or coincidence of a series of deficiencies within a system - SMS concept: To prevent losses, it is necessary to control the entire system from which the loss can arise—which is ultimately an issue of management of policy and practices <p>Status:</p> <ul style="list-style-type: none"> - All federally regulated railways are being audited against SMS regulations - <i>Railway Safety Act</i> review scheduled for 2007-2008 	<p>Current Regulations:</p> <ul style="list-style-type: none"> - Safety Management Regulations were enacted in 1998 pursuant to the <i>Canada Shipping Act</i> and amended to broaden their application in 2002 - Applied international requirements from the Safety of Life at Sea (SOLAS) Convention and associated Code as a minimum <p>Approach:</p> <ul style="list-style-type: none"> - International harmonization by enacting changes to the <i>Canada Shipping Act</i> - Study the appropriateness of SMS to domestic operations - Encourage domestic voluntary compliance during research phase <p>Status:</p> <ul style="list-style-type: none"> - Delegated all the required audits to third parties (classification societies) that operate world-wide, and that also for quite a number of vessels/companies also issue other quality certification such as ISO9001/2000 - TC actively monitors the audits both on board ships (regional responsibility) and on 	<p>Current Regulations:</p> <p>Motor Vehicle Safety</p> <ul style="list-style-type: none"> - Self-certification regime, notice of defect provision, performance-based regulations and standards in effect since 1971 <p>Road Use / Vehicle and Driver Licensing</p> <ul style="list-style-type: none"> - No regulations or standards because jurisdiction is wholly provincial/territorial <p>Approach:</p> <p>Motor Vehicle Safety</p> <ul style="list-style-type: none"> - Legislative changes needed to enable certain SMS enhancements - Where appropriate and feasible, TC works with industry to develop a Memorandum of Understanding (MOU) rather than a regulation – MOU for vehicle telematics still under consideration incorporating SMS principles. - Other MOUs have been successfully negotiated (e.g. side curtain air bags, electronic belt-fit test device) <p>Motor Carrier Safety</p> <p>Development of National Safety Code with provincial/territorial and delegation of enforcement to provincial/territorial level through contribution agreement</p>

TDG	Security	Aircraft Services
<p>Current Regulations:</p> <ul style="list-style-type: none"> - The act, regulations and standards require safety management strategies where appropriate - Most want to comply because of the large, personal and public consequences (culture) - Liability concerns if an accident occurs - Fear of prosecution and penalties are a deterrent - Further, the TDG Act is criminal law and hence of wide application - Indeed it applies to each person/company in Canada unless they are specifically exempted - Transport Canada already has a formal SMS in place for rail, marine and air modes <p>Approach:</p> <ul style="list-style-type: none"> - The regulation of the operation of the vehicle (aircraft, ship, train, bus) carrying the dangerous goods is the jurisdiction of the appropriate mode - Extensive consultation with industry associations and twice annually with the Minister's Advisory Council on the Transport of Dangerous Goods as well as twice annually with all provinces and territories 	<ul style="list-style-type: none"> - The framework is multi-modal, how it is implemented will be sector-specific - Guiding the development and updating of security requirements in other modes (including TDG) - Partnering with provinces and encouraging adoption of SeMS framework (voluntary or mandatory) - Exploring MOU and other instruments, some of which may lead to performance-based, results-focused regulation - Phase 1 – Policy Development & Program Design and phased roll-out of validated tools, best practices and framework (voluntary) - Phase 2 – Program Roll-out (2009) <p>Status:</p> <ul style="list-style-type: none"> - Conducting research, consulting to assess state of security industry's readiness - Selecting action research sites and engaging research partners/stakeholders - Education and awareness sessions conducted for internal and external stakeholders are ongoing - Logic models in development 	<p>Current Regulations:</p> <ul style="list-style-type: none"> - Canadian Aviation Regulations CAR 107 general, CAR 704/703, CAR 573 Maintenance required by December 2007 <p>Approach to Implementation:</p> <ul style="list-style-type: none"> - Gap analysis - Project plan development (Winter 2007) - Will follow Civil Aviation's 3-phase implementation <p>Status of Implementation:</p> <ul style="list-style-type: none"> - Created a safety services office as centre of expertise for SMS - New Manager of Safety Services - Developing targeted training on risk management concepts, principles and application for Aircraft Services staff

Civil Aviation	Rail Safety	Marine Safety	Road Safety
		<p>shore (HQ responsibility)</p> <ul style="list-style-type: none"> - A simplified system with guidance material was developed for small vessels 	<ul style="list-style-type: none"> - Study underway to explore how additional SMS practices could be added to improve motor vehicle safety <p>Motor Carrier Safety</p> <ul style="list-style-type: none"> - Study on appropriateness of SMS to motor carrier industry finalized and will be presented for consideration to provinces/territories in Spring 2007 <p>Road Use / Vehicle and Driver Licensing</p> <ul style="list-style-type: none"> - Monitoring/involvement in development of global definition and principles of Safe Systems Approach (similar to SMS) with OECD and other international bodies

	TDG	Security	Aircraft Services
	<p>Status:</p> <ul style="list-style-type: none"> - TDG act is being reviewed and amended - As criminal law, the Act and regulations apply to each person in Canada - Amendments to the Act will address security issues related to dangerous goods 	<ul style="list-style-type: none"> - Identifying key results areas, performance and security metrics - Identifying and collaborating with existing or proposed initiatives within TC and other government departments that support or could benefit from a SeMS approach - Encouraging the use of the SeMS approach in security operations and policy initiatives 	

Acts, regulations and standards applicable to SMS/SeMS

Civil Aviation	Rail Safety	Marine Safety	Road Safety
<p>Challenges:</p> <ul style="list-style-type: none"> - Difficulty in making required cultural change (internal and external) - Standardizing the interpretation of regulations and expectations - Shift to a new paradigm: systems approach - Understanding the enforcement capacity under the SMS regulations <p>Lessons and Strategies:</p> <ul style="list-style-type: none"> - Phased-in implementation is necessary as it gives the opportunity to continuously improve and it accounts for the length of time it takes to implement - Communication of pilot projects, testing materials, working with industry and internal stakeholders are critical success factors - There needs to be a willingness to learn, to develop, test and iteratively improve - Best programs built piece by piece - Need very strong industry leaders - Regular SMS information sessions given across the country - Regular communication, review and update of the SMS enforcement policy 	<p>Challenges:</p> <ul style="list-style-type: none"> - Slow acceptance - Companies hesitant to perform internal audits - Documentation - Internal TC training - Communication of audit information between TC and companies - Shift in oversight policies and procedures - Smaller railways (provincial and federal) not seeing the benefits of a documented SMS and lack the resources necessary to document, maintain documentation and monitor on a regular basis - Employee involvement in designing the SMS - Reporting requirements from various jurisdictions - A criterion outlining what is an acceptable system and criteria outlining what are acceptable processes - Status of <i>Railway Safety Act</i> and Regulations - Understanding the enforcement capacity under the SMS regulations <p>Lessons and Strategies:</p> <ul style="list-style-type: none"> - Success, notable at management level - Take a systems approach - Practice risk management - Develop triggers for intervention - Train staff and management - Involvement of employees - Instill continuous improvement in practice 	<p>Challenges:</p> <ul style="list-style-type: none"> - Limited application (domestic) - Whether and how to extend SMS to domestic ships - Domestic industry is still unconvinced of the need of SMS (perception of additional costs and paper burden versus benefit) - Need to integrate new “systems” seamlessly - Difficulty in demonstrating that SMS directly contributes to reduce the accident rate - Industry where bottom dollar is driving force/ not ready to accept their own role/responsibility in safety - Reactive industry culture (exception oil companies who see benefits to safety) - Industry sees role of TC inspector as both “consultant” and regulator/enforcer. - Industry reluctance to SMS, perceives advantages of TC conducting inspections and assuming risks - Perception of lack of “teeth” in enforcement actions at present. 	<p>Challenges:</p> <ul style="list-style-type: none"> - Jurisdictional issues (provinces/territories have jurisdiction over motor vehicle operation, licensing, driver licensing, traffic laws and enforcement, road geometrics, motor carrier inspection and enforcement) - Legislative amendments may be necessary to implement some key SMS principles - Industry resistance to SMS approach in general and to its application to telematics in particular - Industry structure (majority of 4,500 companies are small manufacturers in vehicle manufacturing and most motor carriers are one-person owner-operators) - Demonstrating proven safety improvements (i.e. cost-benefit) resulting from SMS <p>Lessons and Strategies:</p> <ul style="list-style-type: none"> - Self-certification as effective as government “type approval” certification model used outside North America - Change is difficult - Present findings from Motor Carrier SMS feasibility study to provinces/territories via Canadian Council of Motor Transport Administrators

	TDG	Security	Aircraft Services
	<p>Challenges:</p> <ul style="list-style-type: none"> - Jurisdictional issues (the regulation of the operation of the vehicle carrying the dangerous goods is the jurisdiction of transportation mode) - SMS is already implemented industry-wide by many dangerous goods producers, by air, marine and rail operators, and by organizations using dangerous goods - Motor vehicle carriers remain unregulated and these challenges are the same for Road Safety - The literacy of the motor vehicle carriers is an important factor given the type of materials being shipped and the documentation associated with these goods, especially under an SMS - The transportation of dangerous goods falls under the UN - International harmonization is very important given the severity of releases and the complexity of the information (e.g. chemical names), multiple languages spoken around the world and the globalization of the transportation of dangerous goods <p>Lessons and Strategies:</p> <ul style="list-style-type: none"> - Requirements flexible and tailored to the capability of the various modes - Consider jurisdiction of TDG regulations and standards versus the jurisdiction of the mode regulations 	<p>Challenges:</p> <ul style="list-style-type: none"> - Coordination and partnerships with multi-directorate and multi-jurisdictional (including municipal, provincial and international as appropriate) organizations, projects and initiatives - Funding of SeMS projects and initiatives - Working within various existing and emerging legal and legislative frameworks - All security policy and operations activities should be aligned with the SeMS approach - Corporate culture change for industry and TC - Innovative work <ul style="list-style-type: none"> – emerging global best practice <p>Lessons and Strategies:</p> <ul style="list-style-type: none"> - Create and participate on multi-directorate and multi-jurisdictional committees, participate on international committees, find synergies between projects - Engage all key stakeholders to the appropriate degree - Create and submit business plan, prioritize activities and deliverables, and find other funding sources 	<p>Challenges:</p> <ul style="list-style-type: none"> - Effecting the culture shift - Buy-in to the benefits - Resources required to implement these actions - Integrating security component seamlessly - Integrating environmental management system - Flexibility in implementing the requirements - Balancing the initial cost and resource increase for the benefits - Access to data necessary to support an effective system <p>Lessons and Strategies:</p> <ul style="list-style-type: none"> - Multiple sub cultures competing within organization make change difficult - A culture takes a long time to develop and therefore takes a long time to change - Cannot change culture without effective communication tools to sell and demonstrate benefits of the change - Invest in human resources work to create capability to deliver SMS - Access government databases, develop data sharing arrangements with other aircraft operators, and improve the collection and classification of internal data through reporting, inspection and survey - Develop and deliver effective training programs, develop communication plan, reward positive behaviour, and active involvement from management to support change

Civil Aviation	Rail Safety	Marine Safety	Road Safety
	<ul style="list-style-type: none"> - Companies need to perform internal audits of their SMS - Provide audit training both at the lead and team member level - Formal review of the <i>Railway Safety Act</i> and Regulations - Regular communication and update of the SMS enforcement policy 	<ul style="list-style-type: none"> - Ability to demonstrate that systems are effective - Risk-taking fisher culture in domestic fishing operations <p>Lessons and Strategies:</p> <ul style="list-style-type: none"> - Study of international implementation – the good got better, the mediocre remained mediocre and the poor remained poor - Provide incentives for domestic operations to adopt - Not delegate audits for domestic operations to reduce financial burden on companies - Demonstrate in quantifiable terms the benefits of SMS - Domestic SMS regulations must be flexible in application 	<ul style="list-style-type: none"> - Continue negotiation with manufacturers on a Memorandum of Understanding for in-vehicle telematics that includes SMS principles

	TDG	Security	Aircraft Services
	<p>and standards and what industry practices exist and are working</p> <ul style="list-style-type: none"> - TDG accidents are like non-TDG accidents – it is in the operation of the vehicle, and all the factors and aspects involved in this that cause and contribute to accidents - Risks of the severity of the accident are mitigated and improved through classification, means of containment, placards, documentation and emergency response planning 	<ul style="list-style-type: none"> - Find the best legislative instruments for each mode and sector – may range from voluntary implementation, contribution programs and MOUs to performance-based/results-focused regulations - Provide education, awareness training and opportunities for input to those affected by these changes, involve them in action research projects, communicate regularly - Research and where feasible test before decisions are made, work to optimize international interoperability, share best practices and validated tools 	

Appendix B

Lexicon

Business Line: A TC program or service.

Enterprise: A business or an activity.

Hazard: A condition, object, or activity that may cause injury to personnel, damage to property, loss of material, or reduce the ability to act.

Risk: The possibility of injury or loss.

Risk Management: A decision-making process where you identify risks, assess their implications, decide on a course of action and evaluate the results. Risk management includes risk assessment and risk control.

Safety: A condition where risks are managed to acceptable levels.

Safety Management System (for TC): a formalized framework for integrating safety into the daily operations of a transportation enterprise¹.

Security: Safeguarding acts of unlawful interference intended to disrupt, cause harm, create terror, or cause damage to or by the transportation system.

Security Management System (for TC): a formalized framework for integrating security into the daily operations of a transportation enterprise.

System: A set of interacting parts (including people, activities, etc.), which form a whole. This whole has properties that cannot be found in the individual parts.

Systems Approach: A way of looking at how and why things happen. A systems approach examines all the interactions and interrelationships of the various parts of a system, and recognizes that changes in one area may affect another (perhaps unforeseen) area.

Threat: An indication or source of pending danger. Any circumstance or event to intentionally exploit vulnerability, with the potential to adversely impact people, assets, systems or environments.

¹ In specific cases, safety management system has been defined in legislation. For specific regulatory requirements please consult the appropriate documentation.