Proactive safety management:
Runway incursions as a case study

M. Mullane, NAV CANADA
T. Kelly, SMS Aviation Safety
Outline

- Safety management in a perfect world
- NAV CANADA’s management of runway incursions
- Discussion
Safety Management in a Perfect World

- Proactive
- Purposeful and comprehensive
- Collaborative
- Appropriate
- Effective
- Explainable/Measurable
Evolution of proactivity

From:

- reliability to performance
- ‘technical’ systems to ‘complete’ systems
Features of proactivity

- Modeling - anticipate
- Design – mitigate
- Prioritize – allocate resources
- Operate – manage
- Evaluate – measure
- Refine - understand
- Re-design
Case study of the design of a performance standard

YVR vs. BDA
Defences
Unsafe Acts
Preconditions
Line Management
Decision Makers
Risk Management Hazard

Defences
Unsafe Acts
Preconditions
Line Management
Decision Makers
Breaches in the Defences

System Hazard

Accident
No Accident
... leading to ...

- Development of performance standards
- Setting risk-based priorities
- Integrating programs under the umbrella of the SMS
- Promotion of true collaboration
- Enhancement of (systems) understanding
- Proactive measures of system performance
Case Study of a Collaborative system

BDCA
Then & Now
Case Study

NAV CANADA & Runway Incursions
NAV CANADA defines SMS as the systematic and comprehensive process for the proactive management of safety risks that integrates the management of operations and technical systems with financial and human resource management.
Why is a Human Factors framework the foundation of the SMS?
Runway Incursion

Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.

(ICAO Definition)
### Statistics

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*AD - ATS Deviation, PD - Pilot Deviation, VPD - Pedestrian or Vehicle Deviation*
What are Safety Risks?

Loss of life or aircraft due to collision between:

- Aircraft (air)-aircraft (ground)
- Aircraft (ground)-aircraft (ground)
- Aircraft-vehicle/craft (land or water)/person
The Safety Map

Weaknesses or Gaps

Organization

Local workplace

Human Performance

Incident or Accident

Weak or Missing Defences

RISKS

PETE

PETE

GEMS
NAV CANADA’s Safety Management System

Safety Philosophy

Safety Policy Level

Safety Goal
Safety Priority
Safety Responsibility
Safety Management

Safety Management System

Safety Planning
Operational Risk Management
Exchange of Safety Information
Safety Performance Measurement
Safety Management Assurance
**Safety Philosophy**

Accidents are organizationally based and as such SMS must integrate technical and operational systems with financial and human resource management.

**Safety Policy Level**

<table>
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<th>Safety Goal</th>
<th>Safety Priority</th>
<th>Safety Responsibility</th>
<th>Safety Management</th>
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<td>To reduce safety risks resulting from the provision by NAV CANADA of air navigation services and products to a level as low as reasonably achievable</td>
<td>Safety is afforded the highest priority over commercial, operational, environmental or social pressures</td>
<td>Everyone has a responsibility to contribute to the achievement of the safety goal</td>
<td>Proactive, systematic, explicit and coordinated management of safety risks</td>
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**Safety Management System**

The systematic and comprehensive processes and procedures for the proactive management of safety risk to ensure that safety management at NAV CANADA is proactive, robust, effective, efficient and integrated across groups and functions in order to achieve the safety goal.
Safety Planning

The planning and management of corporate, group and project safety management activities to ensure that safety management activities are integrated, purposeful, appropriate and measurable.

Examples
Operational Risk Management

The systematic and effective application of suitable risk-management techniques, employing system safety and human factors concepts to reduce the safety risks resulting from the provision, by NAV CANADA, of air navigation services and products to a level as low as reasonable achievable (ALARA).

Examples
Training, staffing, procedures, operational validation process, Investigations, Evaluations, HIRA, Aeronautical Studies
Exchange of Safety Information

The processes used to openly exchange safety-related data and knowledge both externally and internally to the company to share data regarding hazards and system safety deficiencies thereby ensuring risks are ALARA and to promote a strong safety improvement culture within the company.

Examples
Safety Performance Measurement

The development, review and analysis of safety performance measures at all levels of the company to provide the executive and management with meaningful feedback that can be used to enhance safety performance throughout the company.

Examples
Corporate Performance Measures, Human Factors Trend Analysis, Annual Objectives, Safety management activities
Safety Management Assurance

The means for providing assurance that risks are being properly managed to ensure that risk management and safety management decision-making is consistent, rigorous and subject to independent scrutiny and challenge.

Examples
Safety Reviews, follow-up for Operational Safety Investigations/Unit & Training Evaluations, SMS audits
**NAV CANADA’s SMS**

**NAV CANADA Safety Philosophy**

Accidents are organizationally based and as such SMS must integrate technical and operational systems with financial and human resource management.

**Safety Objective**

To reduce safety risks resulting from the provision by NAV CANADA of air navigation services and products to a level as low as reasonably achievable.

**Safety Priorities**

Safety is afforded the highest priority over commercial, operational, environmental or social pressures.

**Safety Responsibility**

Everyone has a responsibility to contribute to the achievement of the safety objective.

**Safety Management**

Proactive, systematic, explicit and coordinated management of safety risks.

**NAV CANADA SAFETY POLICY**

**Safety Planning**

**Definition:**
The planning and management of corporate, group and project safety management activities.

**Objective:**
To assure that safety management activities are integrated.

**Operational Risk Management**

**Definition:**
The systematic and effective application of suitable risk-management techniques, employing system safety and Human Factors concepts.

**Objective:**
To reduce the safety

**Exchange of Safety Information**

**Definition:**
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To share data regarding hazards and system safety deficiencies.

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**Definition:**
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**Definition:**
The means for providing assurance that risks are being properly managed.

**Objective:**
To assure that risk management and safety management.