COSCAP-NA Steering Committee
Safety Management at Bombardier Aerospace

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International Business, Commercial Aircraft

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Ulaanbaatar, Mongolia
Presentation Overview

- Safety Management at Bombardier Aerospace
- Bombardier Aerospace Safety Structure
  - Organization
  - System
- Our Corporate Social Responsibility (CSR) Commitment to Safety
  - Safety Standdown
  - Industry Participation
Evolution of Product Safety Management at Bombardier Aerospace

Traditional Management < 2005

Traditionally safety was equated to compliance; safe = compliant design + compliant operations.

Transition to SMS Concept 2005

Emphasis changed from compliance to performance based management of safety. Introduced a new safety oversight process within Engineering and initiated SMS implementation within the Canadian site maintenance and flight operations as a result of new Transport Canada regulation.

Creation of the Safety Board 2009

Established an executive level Safety Board and Safety Office responsible for governance and oversight of the company’s safety performance, resulting in significant product safety performance improvements for 2009.

One company Safety Management System 2015

One fully integrated and standard SMS across Bombardier Aerospace for efficient and consistent safety management of our products and operations world-wide.
Safety is the Top Operational Lever at Bombardier

Safety Office Mandate: Provide leadership and establish an overall corporate safety strategy & fully integrated system for the management of Product Safety at Bombardier Aerospace.

Scope: Encompasses all processes, stakeholders, tools, activities and everything we do as an organization to ensure and promote the safe design, manufacture, maintenance, training of our products and safe operation of our flight departments and airport.
Bombardier Aerospace Safety System Scope

- Multi-certificate holder
  - Design
  - Manufacturing
  - Maintenance
  - Flight Operations
  - Training Centers
  - Airport

- Global organization with sites in Canada, United States, Europe, Mexico.
Safety Organization (Tier 1)

Bombardier Aerospace

**Safety Board**
15 top executives and site general managers

**Guy Hachey**
President and Chief Operating Officer

**Jean Seguin**
Vice President Quality, Engineering, Manufacturing & AES

**Mario Langlois**
Director Quality Assurance, Quality Control

**Helynne Jetté**
Manager, Safety Office & SMS

**Functional Heads**

- Dan Burns
  - Design
  - Officers
- Larry Dufraimont
  - Flight Ops
  - Officers
- Mario Langlois
  - Manufacturing
  - Officers
- Tom Mayer / Scott Turco
  - Maintenance
  - Officers
- Manny Garyfalakis
  - Airport
  - Officers
- Chris Warton
  - Training
  - Officers
- André Tousignant
  - Air Safety Investigation
  - Officers

Accountable Executive

Responsible for SMS implementation

Responsible for SMS Implementation (delegated)
Safety Organization (Tier 2)

Executives representing the Functional Heads at the Safety Board

- Francois Ouellette (Legal)
- Francois Caza (Design (Head of DAO*))
- Jean Seguin (Manufacturing / Maintenance (PRM*))
- James Hoblyn (Training Centers / Service Centers)
- Simon Roberts (Airport)

Functional Heads

- Andre Tousignant (Air Safety Investigation)
- Dan Burns (Design / Airworthiness)
- Larry Dufrainmont (Flight Operations (DFO*))
- Mario Langlois (Manufacturing)
- Tom Mayer / Scott Turco (Maintenance (AMO) / (MRO))
- Leon Botteron (Training Centers)
- Emmanuel Garyfalakis (Airport)

SMS Chief Officers

- Francois Caza (Chief SMS Officer)
- Mario Langlois (Chief SMS Officer)
- Tom Mayer / Scott Turco (Chief SMS Officers (AMO) / (MRO))
- James Hoblyn (Chief SMS Officer)

SMS Officers

- Francois Ouellette (Chief SMS Officer)
- Jean Seguin (Chief SMS Officer)
- Andre Tousignant (Chief SMS Officer)
- Larry Dufrainmont (Chief SMS Officer)
- Mario Langlois (Chief SMS Officer)

Bombardier Aerospace Staff (+28,000)

- Air Safety Investigation Office
- Design Staff
- Flight Operations Staff
- Manufacturing Staff
- Maintenance / Aircraft Service Centers Staff
- Training Centers Staff
- Airport / Airside Staff

BOMBARDIER
Bombardier Aerospace Dashboard
Dealing with multiple certificates and various national and international requirements

The SMS Safety Standards define the desired company system.

Existing processes will be modified to satisfy new standards.

Transport Canada Regulation
FAA Guidance
EASA Guidance
ICAO Framework Standard
Benchmarking Best Practice

Bombardier
SMS
Safety Standards

Processes & Instructions

Design
Flight Ops
Manufacturing

Maintenance
Airport
Training
### SMS implementation across Bombardier Aerospace

<table>
<thead>
<tr>
<th>Manufacturing</th>
<th>Design</th>
<th>Maintenance</th>
<th>Flight Ops</th>
<th>Training</th>
<th>Airport</th>
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<tbody>
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<td>Saint Laurent Site</td>
<td>CRJ 100/200</td>
<td>GCC</td>
<td>Flexjet - Canada</td>
<td>BATC</td>
<td>Downsview</td>
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<td>Dorval Site</td>
<td>CRJ 700/900</td>
<td>Toronto</td>
<td>Flt Ops (Toronto)</td>
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<td>Mirabel Site</td>
<td>Challenger 600</td>
<td>Stuart Graham</td>
<td>Flt Ops (Dorval)</td>
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<td>Challenger 300</td>
<td>North Bay</td>
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<td>Toronto Site</td>
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<td>North Bay Site</td>
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<td>Wichita (Learjet)</td>
<td>Learjet M45/60</td>
<td>Flexjet - USA</td>
<td>Demo Group</td>
<td>Dallas</td>
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<td>Learjet M60</td>
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<td>Mexico</td>
<td>Learjet out of prod</td>
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<td>Chicago Facility</td>
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**Timeline:**
- 2006 / 10
- 2009 / 13
- 2010 / 14
- 2011 / 15
Bombardier Aerospace Safety Model

- Safety Risk Management
- Safety Governance
- Safety Infrastructure

- Quality Errors
- Design Errors
- Maintenance Errors
- Procedural Infractions
- New Technology etc.
### SMS Maturity Assessment Model

**Characterization:**

<table>
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<tr>
<th>Maturity Assessment Model</th>
<th>Stage 1 - Initial</th>
<th>Stage 2 - Managed</th>
<th>Stage 3 - Controlled</th>
<th>Stage 4 - Proactive</th>
<th>Stage 5 - Optimized</th>
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<td>Core reporting, problem solving and corrective action processes.</td>
<td>Incorporates safety management methodology (SMM) or basic problem solving and corrective action processes.</td>
<td>Shift from management of issues to management of performance, with visibility up to the Accountable Executive / Safety Board.</td>
<td>Increased focus on process identification and mitigation of hazards and use of statistical and other quantitative techniques to identify trends and monitor change.</td>
<td>Formalized processes for leveraging lessons learned, knowledge management and greater use of data in developing predictive and opportunities applications.</td>
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#### Safety Risk Management:

**Current assessment of each functional unit:**

**Design:**
- Current assessment: Initial

**Flight Ops:**
- Current assessment: Initial

**Maintenance:**
- Current assessment: Initial

**Manufacturing:**
- Current assessment: Initial

**Airport:**
- Current assessment: Initial

**Training:**
- Current assessment: Initial
Benefits of the Maturity Assessment Model

- This Maturity Assessment Model defines the required training, competencies / skills, and other supporting infrastructure that is required for each stage of development.

- Each Functional Unit is able to self assess and be evaluated against this Maturity Assessment Model.

- Using the results of this Maturity Assessment Model each Functional Head is able to build their implementation plan, budget resources and enter into the continuous improvement loop of the AES.
## Bombardier Safety Data Management

### Safety Board (ALT)
Guy Hachey, President & COO, Account Executive

**Responsibilities include:**

- Reviewing the company’s Product Safety Policy
- Approving company safety objectives & goals
- Reviewing company’s safety performance indicators
- Reviewing status of SMS deployment / improvement
- Reviewing status of the company’s safety culture transformation
- Reviewing and mandating appropriate actions for product & operational safety issues, as required
- Allocating resources & committing to action, as appropriate to support successful SMS implementation

### Safety Office
Helynne Jette, Manager, Safety Office & Safety Management System

**Managing the overall company SMS implementation plan**
- Overseeing / performing hazard identification, safety risk analysis and safety assessment activities
- Establishing / maintaining company safety standards
- Monitoring safety performance company wide
- Monitoring effectiveness of corrective action processes
- Planning and organizing safety training
- Advising senior management of safety management matters
- Managing / supporting various safety promotion and employment engagement activities
- Monitoring safety concerns in the aviation industry and their perceived impact on the organization’s operations
- Coordinating and communicating with State and International agencies regarding SMS
System Description -- **Features**

- **Facilitated Safety Board (ALT) Decision Making**
  - Fact-based
  - Timely data
  - Risk-based
  - Accurate & more complete info

- **Efficient Governance**
  - Protection of data (SOS)
  - Access restrictions and permissions
  - Retention & Retrieval of data
  - Auditing of the contents of the system
  - Complies with Transport Canada SMS requirements

- **Enhanced Oversight**
  - Built-in monitoring mechanisms (targets/thresholds/priority items)
  - Trending and proactive capabilities required in Phase 3 SMS Implementation

- **Systematical, Centralized Issue Tracking & Management**
  - (5-step standardized process)
    - Identify Issues
    - Assess Risk
    - Decide & Plan Actions
    - Implement Solutions
    - Assess Effectiveness

- **Reliable, Company-wide Standardized Reporting**
  - Electronic forms
  - Multi language
  - Web based
Building Safety Engagement within Bombardier: Step Back for Safety

“Step Back for Safety” seminars are for employees who want to better understand safety issues facing the aerospace industry, and assist in maintaining a strong safety focus across the entire organization.
Building Safety Engagement within Bombardier: Step Back for Safety

- Review recent accidents/incidents and identify lessons learned from these events as they relate to employees

- Report on new developments regarding SMS, and important links between Manufacturing Quality, Safety Management System, and Air Safety Investigation organizations at Bombardier

- Attendees receive a “Commitment to Safety” certificate that is endorsed by senior management
Recipient of 2011 Flight Safety Foundation Meritorious Service Award
Facts & Figures

- Bombardier is the only civil aircraft manufacturer currently offering academic training free-of-charge across the aviation industry.
- Everyone is welcome -- enrollment not limited to Bombardier aircraft pilots, flight crews and technicians.
- Continuing education credits awarded to Safety Standdown U.S. graduates: Embry-Riddle Aeronautical University and National Test Pilot School.
- NBAA’s Certified Aviation Manager (CAM) program provides course credit for Safety Standdown attendees seeking CAM certification and continuing education credit for CAMs.
- Supported by NBAA, EBAA and ABAG.
- Officially recognized by FAA and NTSB.
Evolution: Steady growth over 15 years

To date, close to 5,000 aviation professionals have attended Safety Standdown

First annual Safety Standdown
First year attended by non-Bombardier employees
Bombardier pledges 10 more years
First Latin America edition at LABACE
First European edition at EBACE

June 9, 2011: First China edition in Shanghai
Contributing to International Safety

- Bombardier Aerospace an active member
  - ICCAIA SMS team working in collaboration with ICAO & the ICG (to optimize standards and practices for Annexes 6,8)
  - FAA SMS Aviation Rulemaking Committee that concluded this past year
  - FAA SMS Pilot Project (BBD Service Centers in Tucson, West Virginia)
  - Several industry safety teams & working groups (ECAST, FAST, AIA/GAMA SMS)
  - Host GAMA Safety Workshop
  - GAMA Safety Committee
  - IATA Safety Working Group
  - NBAA Safety Committee
  - IS-BAO Certification of our Flight Demo Group (IBAA membership)
  - Provide guidance and support to operators
  - Participate in industry events and seminars (ICAO GRSS in May 2011)
Building on our Momentum

- Continue working together as a company, and with industry and national aviation authorities, to improve safety in support of our Bombardier mission

“…to lead through innovation and outstanding product safety...”