

How to Best Communicate Risks and Safety Performance in an SMS Environment



CAESN

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BOMBARDIER

Context of SMS at Bombardier Aerospace

- Multi-certificate holder with operations world wide
- SMS currently applicable to our Approved Maintenance Organization (AMO) and some aspects of our Flight Operations
- Recognize SMS is the right approach and have completed 95% of our company wide Gap Analysis

Multiple TCs/STCs
PC/POA/ Manufacturing
AMO/BAS/ CAS
Operator (Flexjet/Shuttle)
Training/ Distribution
DAO/DOA/DAS

SMS is currently being implemented for all of Bombardier Aerospace

Pre-requisites for Communicating Risk and Safety Performance

- In order to best communicate risk and safety performance internally within Bombardier, and externally to our customers and regulatory agencies, we must have good, reliable data
- This data must be gathered and reported in a consistent fashion in order to maintain credibility
- This data must help us understand what presents the greatest risk and what needs to be fixed
- The safety culture must be in place in order to ensure we focus on the safety performance of the product, and avoid “playing the numbers”
- There are no “magic algorithms” that can be applied to all data to define or anticipate the next emerging safety issue

Fundamental basis for communication is good, reliable, consistent data

Safety Performance =

Measuring the number of discovered problems that represent an unknown and known safety risk.



unknown & known safety risk

risk



technical resolution and corrective action implementation

Measuring our performance in reducing that risk through technical resolution and implementation of corrective action.

Internal Communication of Risk and Safety Performance

- Communication of risk and safety performance at Bombardier is managed through a scorecard approach, with drill downs to the identified risks and safety performance, followed up with different management level reviews
- A monthly “Product Integrity and Safety” report is produced that captures all potential safety issues that have been identified to Bombardier
 - This report contains the top level product line performance scorecards, as well as all the details of these issues including the determined risk
 - This report also identifies emerging issues, trends and specific issues requiring attention

Bombardier utilizes a scorecard approach for internal communication

Product Integrity & Safety Report

Product-line Performance Summaries

Programs	Invest's		Risk Level Assessment					Red-tagged	Total PI&S Issues	Technical Resolution	Performance to Schedule	Fleet Campaign	# of KPI not meeting minimums	Overall % Rating	Last month overall rating
	Total	Red-tagged	TBD	Low	Medium	High or Extremely High	Total								
CL600	4	2	2	4	8	1	15	4	19	93	80	60	1	83	77
CL300	4	0	1	2	6	0	9	3	13	89	89	60	2	85	87
M20	0	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
M31/35/36	0	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
M40/L45	0	0	0	2	6	2	10	2	10	100	80	N/A	0	93	88
M55	0	0	0	0	0	0	0	0	0	N/A	N/A	N/A	2	N/A	N/A
M60	0	0	0	1	3	2	6	3	6	83	50	N/A	2	78	83
Global	9	1	0	3	7	0	10	2	19	80	100	100	1	95	93
BU rating:													87	86	

Emerging issues since last report				
Status	Program	Issue	Impact	Risk Level
investigation	CL300	Rudder travel limiter transorb failure	Rudder run away	low
investigation	CL300	Thrust reverser quadrant partially jammed by ice accumulations	TBD	TBD
		Fasteners	Standby Instrument Fluctuations	medium
			Departure of engine cowl access panels	TBD

Owner	Location	Inv. Authority

All-Caused IFSD rate	Code
CL600	0.000
CL601-604	0.008
CL300	0.000
CL800	0.000
M45	0.032
M60	0.022
Global XR	0.012

* IFSD rates done quarterly

Overall rating %	Code
> or = 85 %	Green
85% > ... > or = 60%	Yellow
< 60%	Red

Key Performance Indicators	Definitions	Objectives
1) # of PI&S Issues	Combination of investigations and projects that have been identified as PI&S issues	< or = 20
2) % of Technical resolution	Programs lose 5% for every issue above the objective	> or = 90%
3) % Performance to Schedule	% of projects for which a CAP has been developed	> or = 80%
4) % Campaign on Schedule	For fleet campaign implementation only; Programs lose 20% for every campaign "mandate", 10% for "very late" and 5% for "late"	> or = 80%

Specific Issues Requiring Attention

Regional Aircraft – Red Tag Items		Effective since:		
Program	Project	Tech Sec'n	Schedule	Fleet Campaign
CRJ200	Airport PCU back track check (root cause unknown)	Nov-04		
CRJ200	Airport PCU track failure (root cause unknown)	Aug-04		
CRJ200	Loss of Spoilers upon roll disconnect (finalize tech cowl w/ vendor)	Nov-04		
CRJ200	SPS AOA Sensor Anomalies (no pin e-ata data?)			
CRJ200	PRCA Bell Jar Laboratory - pin failure (collected req'd for new pin config)			
CRJ200	Autopilot no clutch failure in flight (determine the VSB compliance time)			
CRJ200	Fuel Feed Line Misalignment		Apr-05	
CRJ200	MLG fitting replacement		Apr-05	
CRJ200	Cracked Main Frame JCLH		Apr-05	
CRJ200	Pool Probe Trim Indication			Feb-05

Regional Aircraft – Dash8-400 CAW projects ... page 1a of 2

Regional Aircraft – Dash8-400 CAW projects ... page 2a of 2

Regional Aircraft – CRJ200 CAW projects ... page 1a of 2

PCRs	Project	Impact	Risk Level	Comments off no Corrective Action Plan available	Corrective Action Plan	Aging (mths)
1 22-1	Autopilot Servo Clutch Failure in Flight	In-flight control		Clean/lubricate elevator servo Assy.	Y	8
2 24-10	Leach Relay Substrate Cracking	Loss of function		Remove and replace relays in locations noted as Hazardous and Major	Y	7
3 24-5	ADG falling off line 2 second after deployment	No Power when ADG depl		*k wiring	Y	8

Regional Aircraft

CRJ 100/700 In-Flight (IFSD) Rate

CRJ-34-3A1/3

Transformed into Information

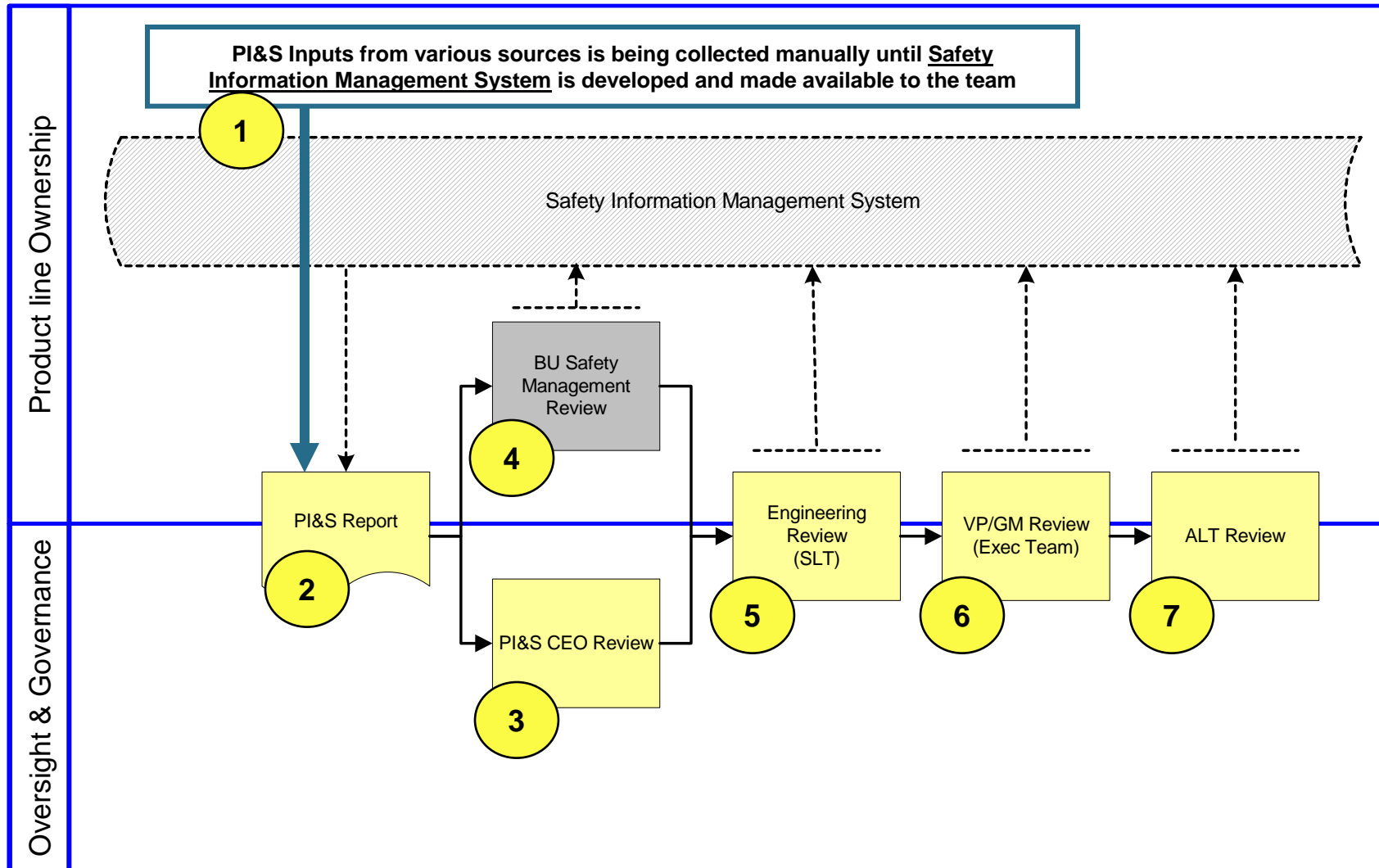
12mth moving avg (1-Mar-05): 0.0029 IFSD_cyc

Bombardier Proprietary Information - Confidential

Category	2003	2004	2005
LPDR	3	3	3
New Sys	34	34	34
Downs	52	57	57
Wings	72	72	72
Engine	78	79	79
Exhaust	0	0	0
Oil	1	1	1
Starting	1	1	1
Misc	1	1	1
05-09	2	1	1
CRJ200 Total	42	48	47

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Risk and Safety Performance Management Reviews



External Communication of Risk and Safety Performance

Operators

- All Operator Messages/ Advisory Wires
- Our Operators can identify those operational hazards that need to be considered in establishing risk
- High level of safety performance is expected, not communicated

Suppliers

- Our Suppliers have critical information regarding the operation/functionality of their designed components Must communicate freely outside of the “commercial liability” environment
- Suppliers do not understand risk at the aircraft level, so they must be integrated into our safety network

SMS Implementation must integrate Suppliers and Operators

External Communication of Risk and Safety Performance



Regulatory
Agencies

- Migrated from qualitative to quantitative approach to reduce emotional based discussions
- At Bombardier, Continuing Airworthiness Assessment communicates the risks
 - **Documents the hazard, determined risk, mitigating actions (if any) and proposed corrective action plan**
- For safety performance communications, we do not currently have a accepted means to communicate with TCCA, and in its absence, it is performance to commitments and perception

Communication means with Authorities must be understood and agreed