

Safety Risk Management Automation

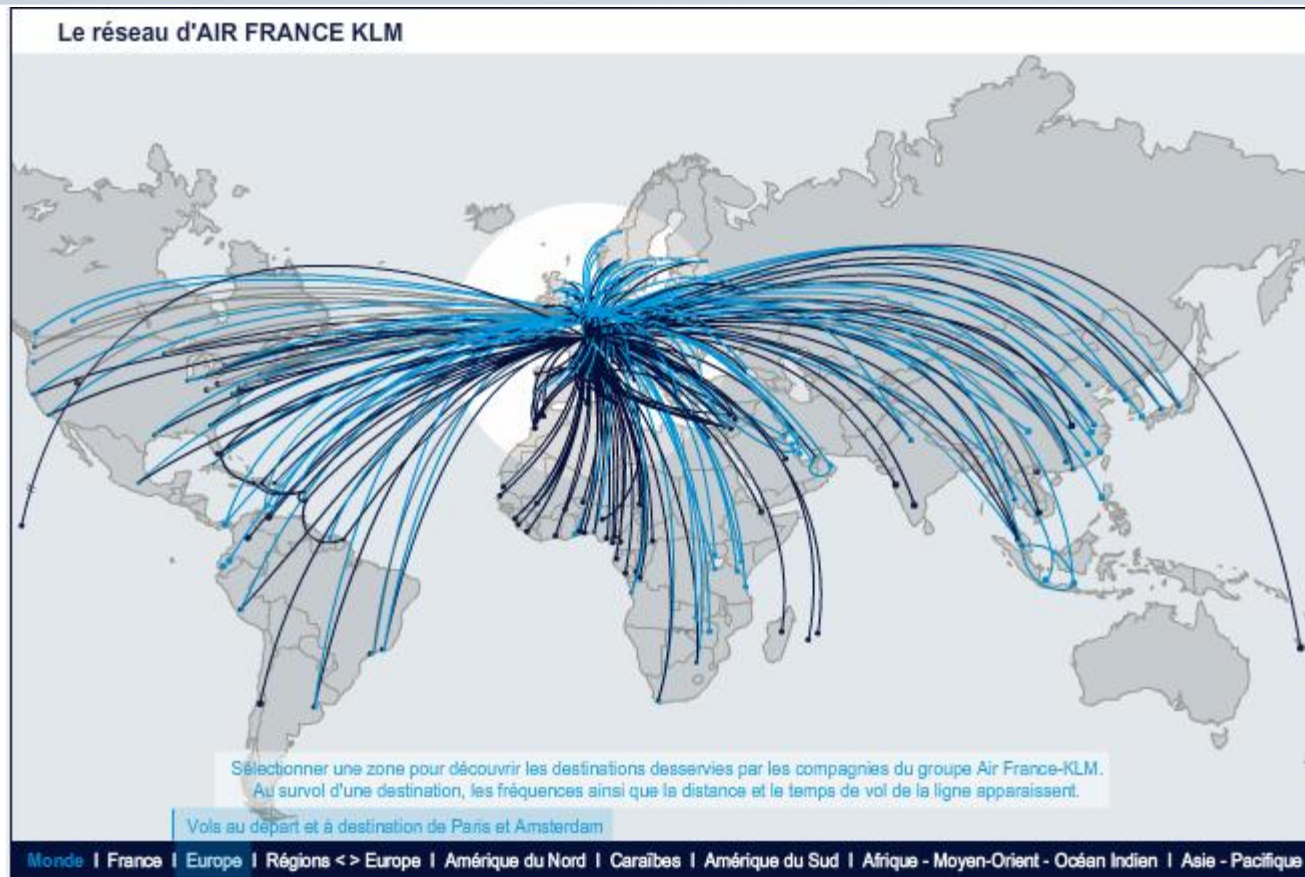
SMS and Risk assessment automation

SMICG industry day
Bern - may 16th



Air France key figures 2013

Wordwide network

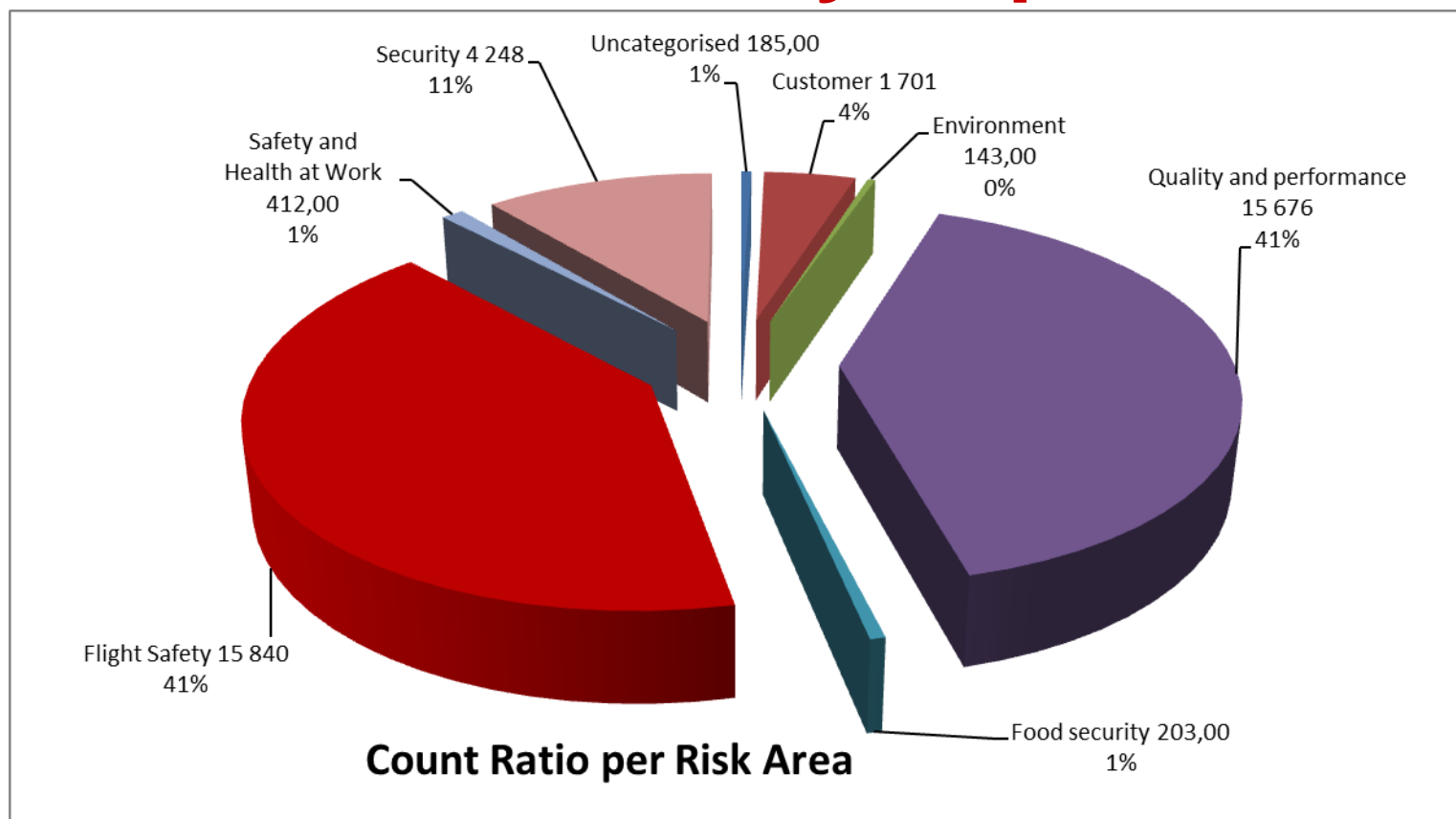


- 78 millions passengers
- 800 flights per day
- 69 000 employees
- 242 aircraft
- 243 airports (AF/KL)

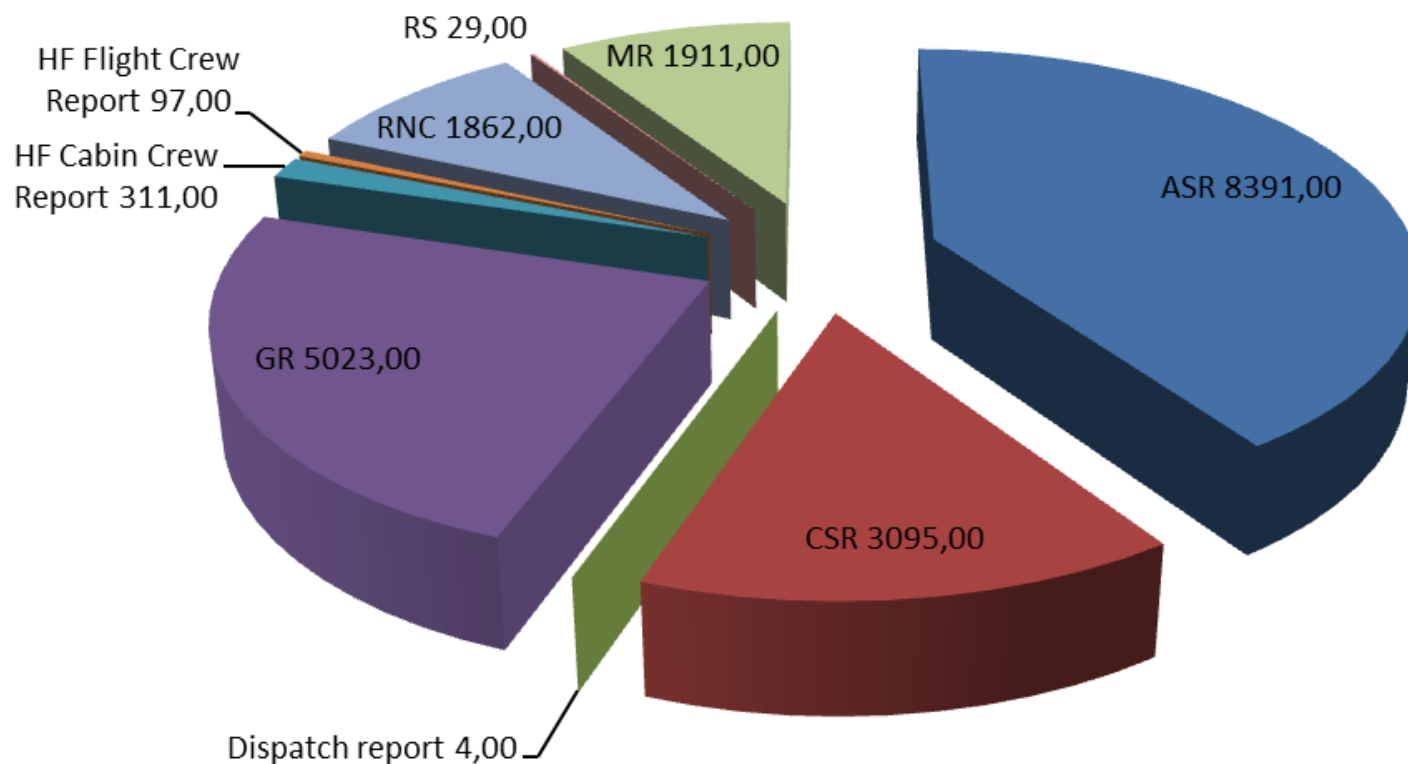
Integrated Management System Reports 2013

36 000 Reports

15 000 Safety Reports

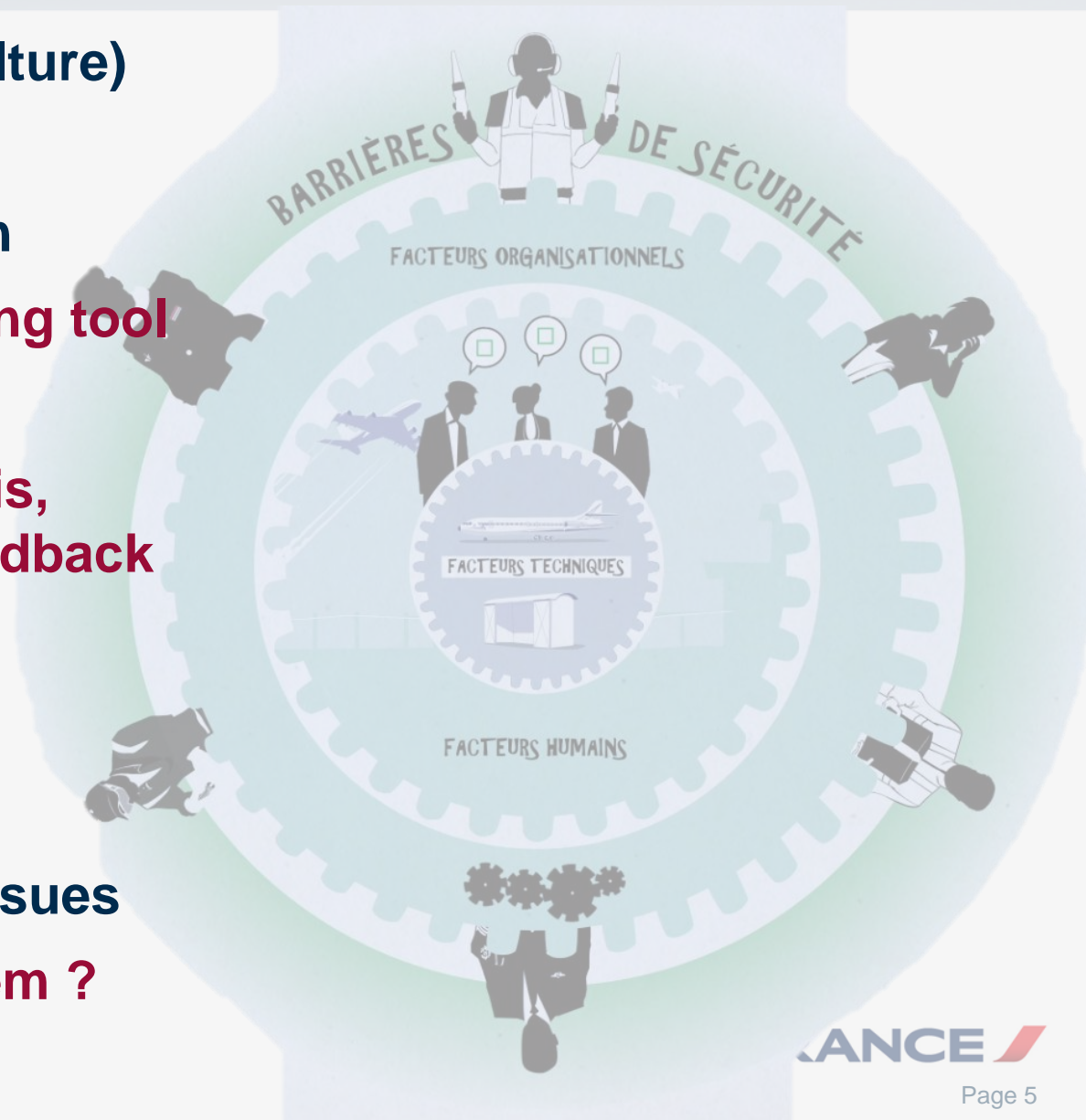


Safety reports 2013 by origin



Need for IMS, SMS

- All involved (Safety Culture)
 - ✓ **IMS or SMS**
- Participative dimension
 - ✓ **One common reporting tool**
- Be reactive
 - ✓ **Investigation, analysis, corrective action, feedback**
- Be proactive
 - ✓ **Safety barriers**
 - ✓ **Risk model**
- Risk factors – Safety Issues
 - ✓ **How to anticipate them ?**



EtQ...

We Care...

Reliance...

ICARE

eCARE

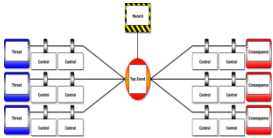
Challenges raised with eCARE implementation

Define a common process between Ops Divisions

Define a common risk model

Risk Management Process

Continuous Improvement



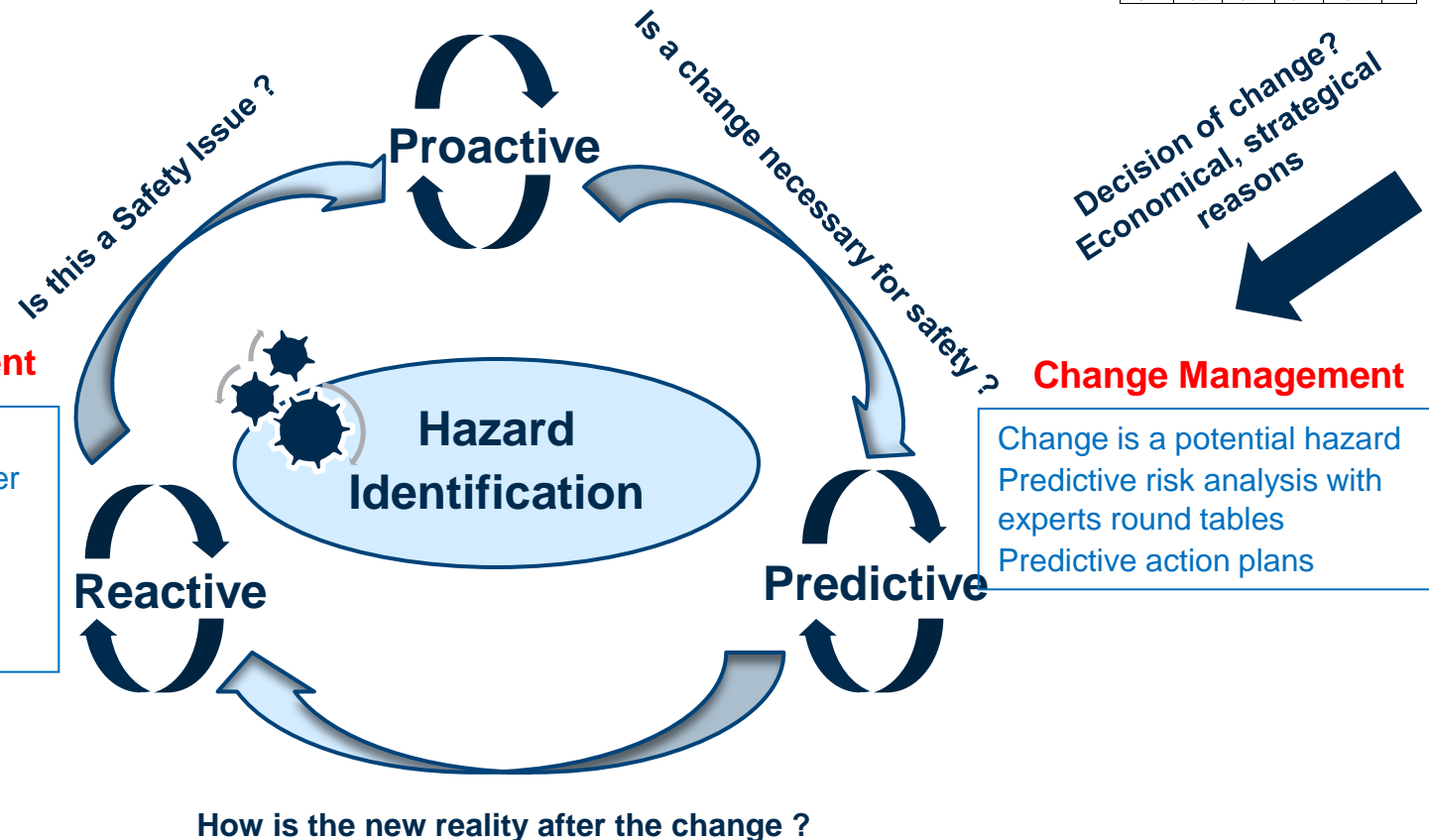
Barrier management with Bow Ties (leading indicators)...coming soon
Safety surveys considering Safety Issues with actual hazard
Proactive action plans

Probabilité d'accidents						
1.E-01	Totalement probable	Secure	Improve	Stop	Stop	Stop
1.E-02	Probable	Monitor	Secure	Improve	Stop	Stop
1.E-03						
1.E-04	Pas probable	Monitor	Monitor	Secure	Improve	Stop
1.E-05						
1.E-06	Totalement improbable	Monitor	Monitor	Monitor	Secure	Improve
1.E-07						
1.E-08	Improbable	Monitor	Monitor	Monitor	Monitor	Secure
1.E-09						
1.E-10						
		Negligable	Minor	Medium	Major	Catastrophique
		1.E-01	1.E-03	1.E-05	1.E-07	1.E-09
						Gravité

Occurrence Management

Event analysis
Significant failure of a barrier
Event Risk Classification
(lagging indicators)
Immediate action or
conservatory measure

Question 2				Question 1			
What was the effectiveness of the remaining barriers when the next and the most possible accident occurred?				If this event had occurred in an accident scenario, what would have been the most likely outcome?			
Effective	Control	Monitor	Not effective	Catastrophic	Loss of aircraft or multiple fatalities (3 or more)	Major accident	Loss of aircraft or multiple fatalities (1 or 2 fatalities, multiple serious injuries, major damage to the aircraft)
10	100	100	100	10	100	100	100
10	20	100	100	10	100	100	100
2	4	20	100	2	4	20	100
1	1	1	1	1	1	1	1



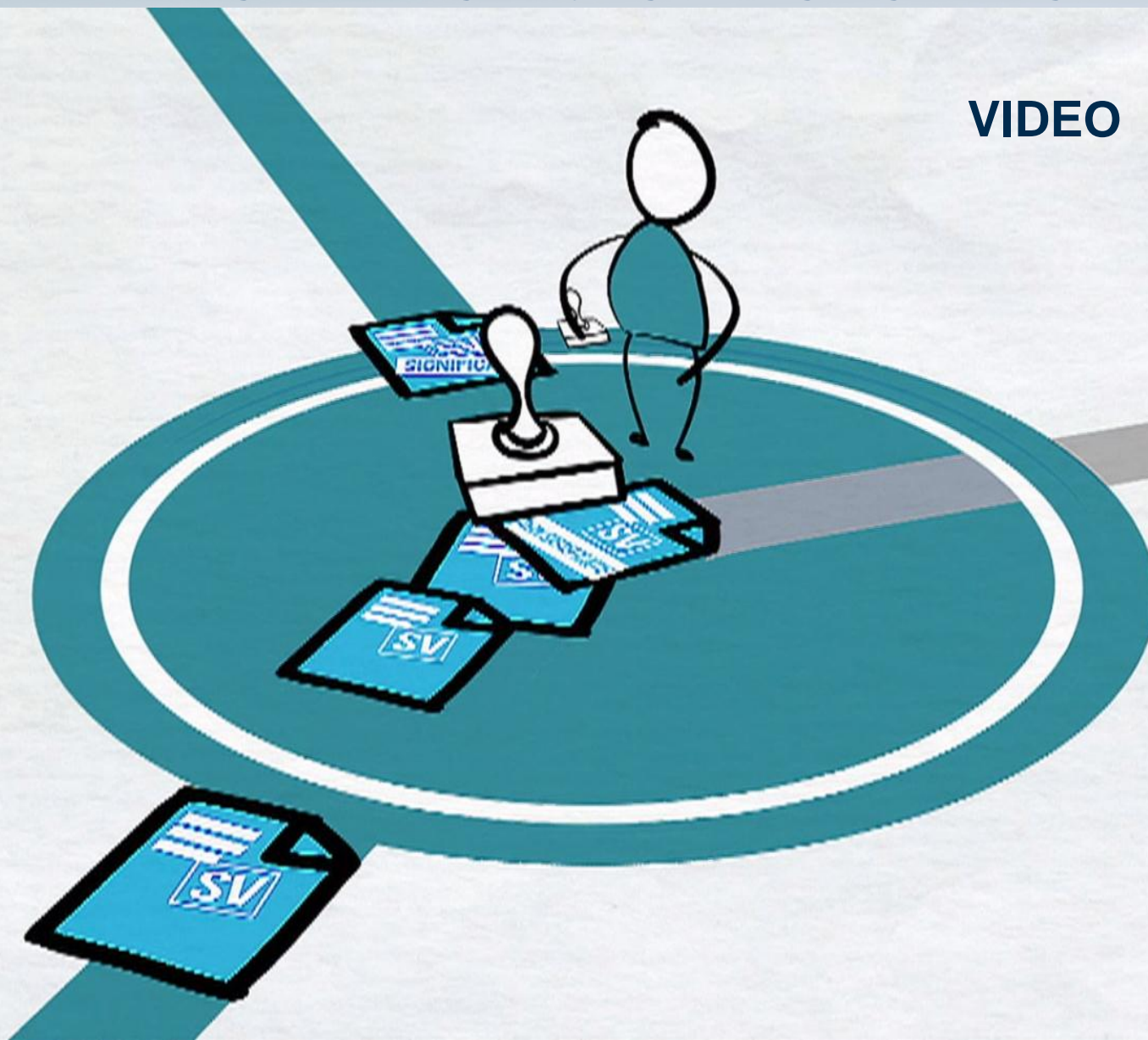
Change Management

Change is a potential hazard
Predictive risk analysis with
experts round tables
Predictive action plans

Occurrence management process

One tool : reporting, dispatching, analyzing, investigating, reacting, anticipating...

VIDEO



Link between Reactive and Proactive process

Occurrence reports management

- in each division
- transversal

Safety round table for significant events

Corporate weekly meeting

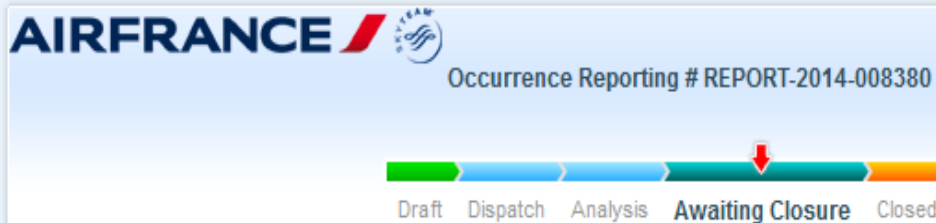
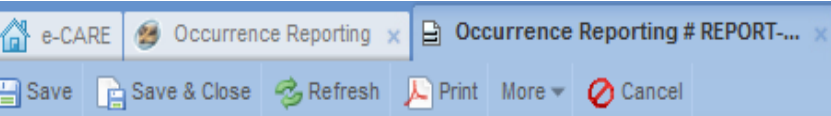
Using Event Risk
Classification (ARMS) to take
immediate action

Using AF current Risk Model
to register data and assess
systemic Risk level



Safety Risk Management Process

Dispatching



Report **Dispatch** Analysis Access Control All Tabs

Occurrence report dispatch / Orientation du rapport d'événement

Risk Categories

- ☒ Sécurité des vols ☐ Environnement ☐ Sécurité-Santé au travail ☐ Client ☐ Sûreté
☐ Qualité-performance ☐ Sécurité alimentaire

Comments (Dispatch)

Attachments



Business Process & Sub Process

Save

Save & Close

Cancel



Safety Risk Management Process

SMI Risk Allocation and Assessment

Report

Dispatch

Analysis

Access Control

All Tabs

Risk Analysis/Analyse du Risque

Flight Safety

☒ Taken into account by :

Assigned Analyst (Flight Safety)

MATTHIEU COLAS

Analysis completed (Flight Safety)

☒ Yes ☐ No

Environment

☐ Taken into account by :

Assigned Analyst (Environment)

Analysis completed (Environment)

☐ Yes ☒ No

Occupational Safety

☐ Taken into account by :

Assigned Analyst (Occupational Safety)

Analysis completed (Occupational Safety)

☐ Yes ☒ No

Suggested Reports

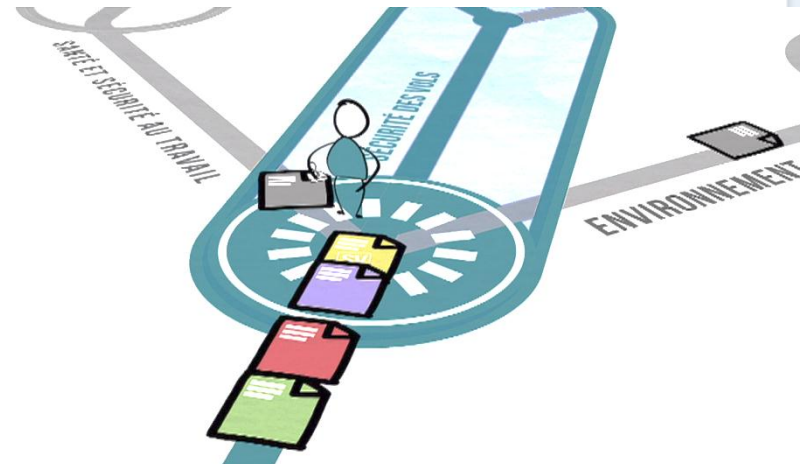
Suggested reports

#2014-007012 - RDC - GP, created 27 févr. 2014 (Closed)

#2014-006990 - ER - MESSAGE CHARGEMENT, created 26 févr. 2014 (Closed)

☐ Add all suggested reports to the related reports list

Related reports



ERC : ARMS methodology

2D Vision (scenario of accident and remaining barriers)

Analysis/Analyse - Flight Safety/Sécurité des vols

Event Risk Classification (ERC)

Question 2

What was the effectiveness of the remaining barriers between this event and the most credible accident scenario ?

Effective	Limited	Minimal	Not effective
50	102	502	2500
10	21	101	500
2	4	20	100
1			

Question 1

If this event had escalated into an accident outcome, what would have been the most credible outcome ?

Catastrophic	Loss of aircraft or multiple fatalities (3 or more)
Major	1 or 2 fatalities, multiple serious injuries, major damage to the aircraft
Moderate	Moderate injuries or damage to the aircraft
Minor or no accident outcome	No potential damage or injury could occur

☐ CRE ☐ DSAC ☐ DSA

Select RX if relevant

☐ RX2

OACI Annex 13

Attachments



☒ Risk assessment required



Risk unacceptable : Immediate action, conservatory measures and safety Issue risk assessment

Risk tolerable : Risk analysis necessary

Risk acceptable : Data register

Safety expert round table

Corporate weekly meeting (RX2)

Risk Assessment Flight Safety

AIRFRANCE

Event register and global risk assessment

- ✓ Unsafe state
- ✓ Control Barriers
- ✓ Undesired event
- ✓ Recovery Barriers
- ✓ Consequence

- ✓ Systemic Risk Level
(estimated)

Risk Assessment Flight Safety
✕ More ▾

DG concerned

DGOA
▾

Unsafe state - ENS (Flight Safety)

Maintenance : Management du vol - PA - NAV - Instrument : Non renseigné par DGOA : FD

ENS est. frequency
☐ Very Rare
☐ Rare
☐ Occasional
☐ Frequent
☐ Very Frequent

Calculated on document save:

ENS Calc. Frequency (average nb per year)
2,35

Rate of EI occurred for selected Unsafe states
0,10

Controls

ENS may cause EI
☐ Very Unlikely
☐ Unlikely
☐ Possibly
☐ Likely
☐ Certainly

Undesirable Event - EI (Flight Safety)

▾

EI Occurred?
☐ Yes
☐ No

Recovery

EI may cause accident
☐ Very Unlikely
☐ Unlikely
☐ Possibly
☐ Likely
☐ Certainly

Calculated on document save:

Consequence

▾

Risk Level

Monitor
Secure
Improve
Risk

Global Risk assessment eCARE

3D Vision

Risk Assessment Flight Safety

DG concerned
DGOA

Unsafe state - ENS (Flight Safety)
Maintenance : Management du vol - PA - NAV - Instrument : Non renseigné par DGOA : FD

ENS est. frequency ☐ Very Rare ☐ Rare ☐ Occasional ☐ Frequent ☐ Very Frequent

Calculated on document save: ENS Calc. Frequency (average nb per year) 2,35 Rate of EI occurred for selected Unsafe states 0,10

Controls

ENS may cause EI ☐ Very Unlikely ☐ Unlikely ☐ Possibly ☐ Likely ☐ Certainly

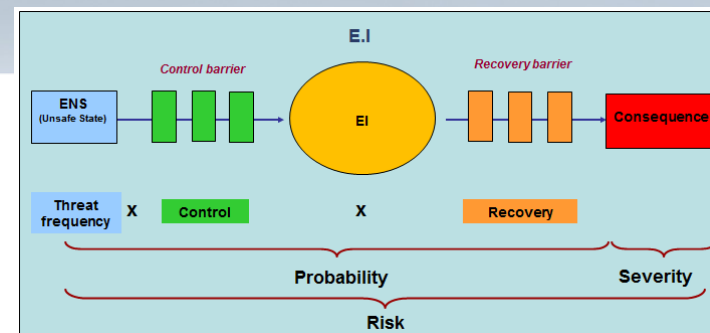
Undesirable Event - EI (Flight Safety)
EI Occurred? ☐ Yes ☐ No

Recovery

EI may cause accident ☐ Very Unlikely ☐ Unlikely ☐ Possibly ☐ Likely ☐ Certainly

Calculated on document save: Consequence Risk Level

Monitor
Secure
Improve
Stop



Threat frequency

Probability of control
barrier failure

Probability of recovery
barrier failure

**Systemic
Risk Level**

Consequence (IATA)

e-CARE Occurrence Reporting # REPORT-... Occurrence Reporting # REPORT-...

Save Save & Close Refresh Print More Cancel

Controls

ENS produces EI ☐ JAMAIS ☐ IMPROBABLE ☒ RAREMENT ☐ SOUVENT ☐ TOUJOURS

Undesirable Event - EI (Flight Safety)

Anomalie poussée : Dissymétrie de poussée affectant la pilotabilité EI Occurred? ☒ Yes ☐ No

Recovery

EI produces Accident ☐ JAMAIS ☐ IMPROBABLE ☒ RAREMENT ☐ SOUVENT ☐ TOUJOURS

Calculated on document save:

Consequence	Risk Level	Score
Perte de controle	Improve	56

Comments (Flight Safety - Analysis)

Attachments

+ Add Record

Action Plans

Consequence dropdown menu:

- Blessures et dommages au sol
- Blessures et dommages en vol
- CFIT
- Collision en vol
- Collision sur piste
- Contact anormal avec la piste
- Perte de controle en vol
- Sortie de piste

Investigation in eCARE

Investigation (New) Created by PIERRE-HENRI MOREAU on 10 mars 2014 15:56:14

☒ Draft ☐ Investigate ☐ Closed

Problem Statement Access Control All Tabs

Last Comment Comments (Add View History)

Document Links Investigation Number Please Save

Attachments Other Links

Origin (if not audit or occurrence report)

Created By PIERRE-HENRI MOREAU Assign Investigation To

Investigation Subject

Investigation Type

- Pilotage
- Enquête interne
- Enquête simplifiée
- Complément d'info sur événement
- EDS Systémique (prédictif)
- EDS Changement (prédictif)

Investigation Due Date

Describe what happened. Give additional background and descriptive information. Identify the location of the failure, equipment involved (including identification numbers, part numbers, and expiration dates).

Investigation Description

[Assignment e-CARE] Investigation # Draft

- ✓ Maintenance investigation
- ✓ Corporate investigation
- ✓ Simplified investigation
- ✓ Need of info
- ✓ Safety Issue Study
- ✓ Changes Safety Study
- ✓ IMS investigation

CR hebdomadaire d'événements Extrait d' eCARE

Date RX2	Type Rapport	N° Rapport	Événement, analyse et mise en perspective	ERC	Domaine de risque	Évén. Indésir. Occured or not	Risk level	Commentaires, informations, décisions RX2	Date info préalable BEA DSAC
06/05/14	ASR	REPORT-2014-015106	OADC A320 FGKXG TO3083/27APR SAW ORY ERREUR DE CENTRAGE État de charge réalisé par la coordo à SA/W avec les formulaires papier disponibles à bord. Pendant le décollage, sensation que la roulette de nez se soulève anormalement vite.	50	Perte de contrôle en vol	Yes	Improve	Investigation envoyée à TO via DOQP compagnies partenaires. Proposé en CREM (Transavia). Retenu en ASR Terrain. Point RX2 S18@1 : DOQP (Direction Qualité et Conformité) : Retour attendu sur l'investigation auprès de l'escalade.	
06/05/14	ER (Rapport d'événement)	REPORT-2014-014944	MCQS AF1197 26AVR CMN-CDG 458kg de bags déclarés en 53 (avec 52 NIL), 900kg trouvés en 53 et 52 à l'arrivée. Impact masse et centrage : MACZFw +1.93 MACTOW +1.65	50	Perte de contrôle en vol	No	Improve	En attente retour d'investigation escale Pour info : changement récent de prestataire. RAM a repris le handling le 29 mars 2014. Présence d'un CEP sur chaque vol coté piste les 15 premiers jours pour accompagnement C2 et Agent K sur procédures AF avec reporting quotidien transmis au management RAM. Présence AF tous les 2 ou 3 jours depuis 15 jours. Au quotidien : présence d'un CEP AF sur chaque vol positionné coté piste ou passage selon besoins et difficultés du vol. Sur vol présence d'un CEP coté passage en raison d'une survente et de difficultés à embarquement. Suivi des clos RX2 CSF intégré et lié à l'ASR.	
06/05/14	ASR	REPORT-2014-015854	OADC A320 FGRXG AF4387 VCE-NCE : OUVERTURE PORTE SANS DÉSARMEMENT DU TOBOGGAN A l'arrivée au parking à NICE, ouverture de la porte avant gauche sans désarmement du toboggan. Déploiement partiel du toboggan au seuil de porte.	101	Événements et dommages au sol	Yes	Secure	L'OSV et le chef Pilote Base Nice ont contacté l'équipage. Entretien CSV Point RX2 S18@8 MCQS (Direction Exploitation Sol) : Retour attendu sur la version du RZA présent à l'ouverture de la porte pour le 13/05/14	
06/05/14	ASR	REPORT-2014-015108	OADC A320 FHEPC AF1258/27APR CDG-RBA ECART DE ROUTE No refreshed fpl received from handling agent, no information about fpl change. A couple of minutes after BANYO wpt, spanish ato advises us that they were expecting us to fly via MOLIN, HIJ and SVL. After coordination with Sevilla ato we were allowed to follow our initially intended route via CJN, ANZAN, BLN, MIA and GALTO.	50	Collision en vol	Yes	Secure	Investigation envoyée à l'Etude Centrale des Vols et Exploitation Sol. La préparation des vols Mono Tronçon sera effective dès septembre 2014 mettant fin à cette problématique. Point RX2 2014 S18@2 (MCQS) : Retour CDG attendu pour savoir si Refresh plan de vol communiqué par RZA pour le 13/05/14	
06/05/14	ASR	REPORT-2014-015118	OADC A321 FGTAL AF1983 PRG-CDG : wrong SID inserted in the FMS Crossing PR619, the aircraft turns left according to the FMS. Immédiatement après le départ, le contrôleur demande à l'équipage de maintenir la présente heading 330°. The crew identifies a mistake of FMS programming and apologizes. The crew didn't notice a traffic conflict at TCAS.	50	Collision en vol	Yes	Secure	(CREM) : ÉCART DE TRAJECTOIRE AU DÉPART (Erreur insertion FMS / SID départ hélices / Problématique Cartes LIDO) ASR à rapprocher de l'ASR2014-015867 PRIORITÉ SV 2014 : Pilotage Manuel et gestion des Automatismes RETENU EN ASR TERRAIN à rapprocher S17@6	
06/05/14	ASR	REPORT-2014-015717	OADC/BLGQ : A319 FGRXE AF1527/30APR NCE-CDG : COUPURE MOTEUR SUITE BAISSÉ D'HUILE GTR2 ENG 2 LO PRESS and ENG 2 SHUT DOWN on cockpit and procedures are applied. MAY DAY sent to ROMA control and crew declares to divert to Milan.	50	Perte de contrôle en vol	Yes	Secure	Investigation envoyée à la Maintenance : Actions Maintenance : Actions entreprises: A LIN, constaté niveau d'huile à 0. Bouchons magnétiques recouverts de limaille. Remplacement du moteur. Décision RX DGI du 6/5/14: Attente retour shop. Fil rouge. Butée au 10/06/14. PRIORITÉ SV 2014 : Culture SV RX2 2014 S18@5 BLGQ retour sur fil rouge pour le 10/06/14	
06/05/14	ASR	REPORT-2014-015867	OADC A320 FGKXK TO3567 PRG-ORY : ECART DE NAVIGATION SUITE ERREUR INSERTION FMS After take off the crew flew BALU 2D SID instead of BALU 2E. Mistake is detected by ATC after left turn.	50	Collision en vol	Yes	Secure	ASR à rapprocher de l'ASR2014-015118 /NOTIFICATION ENVOYÉE VERS Délégué EUROPE /RETENU EN ASR TERRAIN à rapprocher S17@6	
06/05/14	ASR	REPORT-2014-013882	OADC A320 FGHQL AF7837 LYS-NCE : MAUVAISE INSERTION MASSE POUR CALCUL DES PARAMÈTRES DÉCOLLAGE Insertion de la masse ZFW 50T8 au lieu de 55T7 par le CDB PM, avion non équipé d'EFB. L'équipage ne l'a pas détecté lors du briefing Airbus. Les vitesses sont V1 114kt / VR 121kt / V2 124kt flex 54°C. Lors du briefing l'OPL a mentionné les vitesses	21	Sortie de piste	Yes	Secure	RETOUR D'EXPERIENCE VERS L'EQUIPAGE : CONTACT A DÉJÀ EU LIEU AVEC L'OSV (vitesse forte car assiette limitée à 17° par construction (avion léger)) Sujet proposé en CREM (Comité de Revue de Evènements Mensuel) : ERREUR INSERTION FMS / PROJET DOC	

Time boxing project and now on

2 years...

AF only Safety model

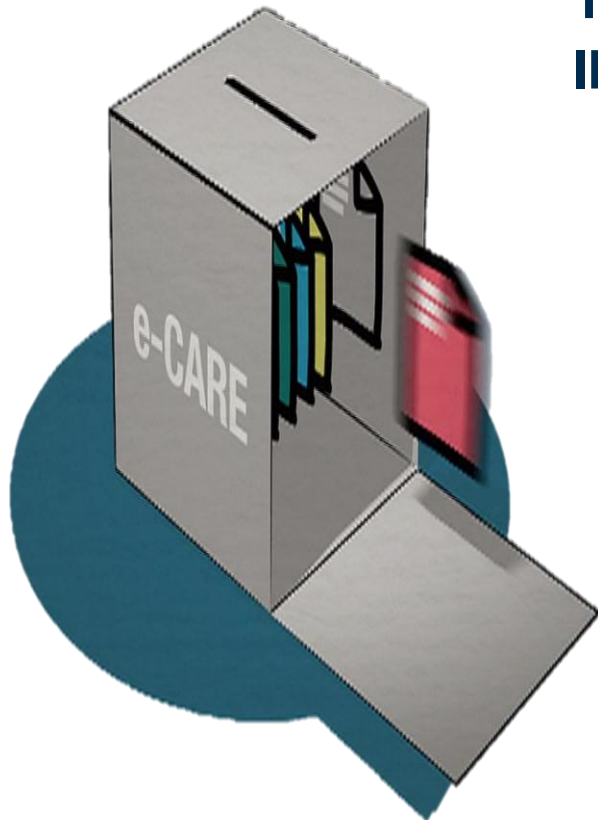
Training

Too rich...

Reactive, not enough proactive

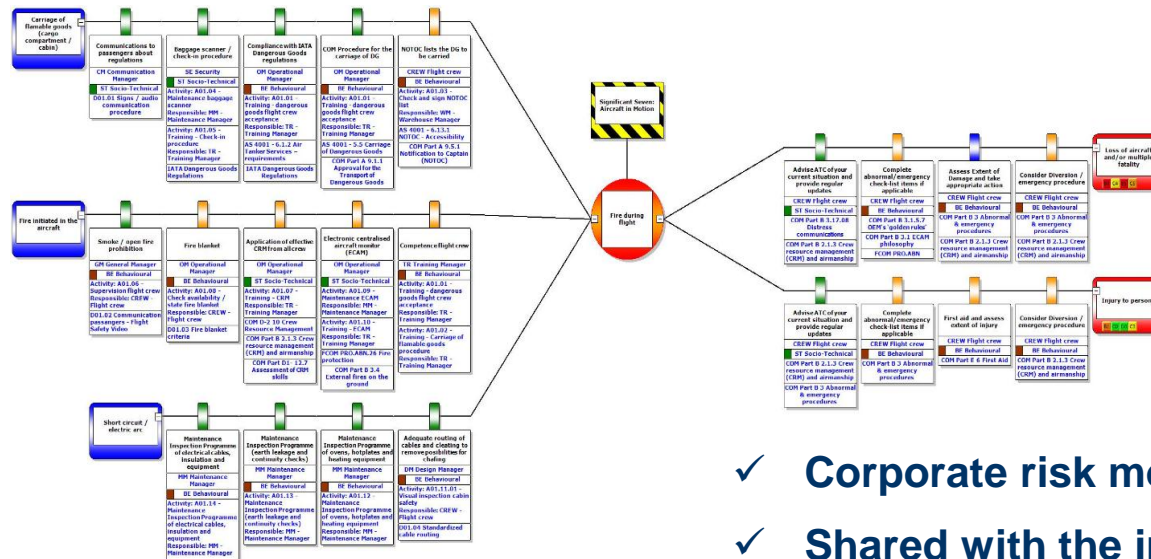
Transversal

IMS orientated



Coming soon...

**Aviation Industry approach : Bow tie
Barrier performances monitoring (KPI)
Extend data register to Audits, FDM,
ATQP, LOSA...**



Bow Tie Model

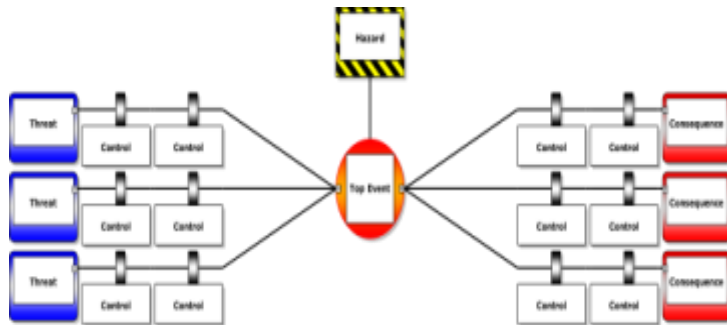
Our expectations...

- ✓ **Corporate risk model in Air France**
- ✓ **Shared with the industry**
- ✓ **Tool for investigation and event analysis**
- ✓ **Easier risk assessment**
- ✓ **Barrier management (KPI), leading indicators**
- ✓ **Integrate Audits, LOSA, FDM, ATQP, Reports with HF**
- ✓ **Training and comprehensive material**
- ✓ **Collaborative work with editors and consultants**

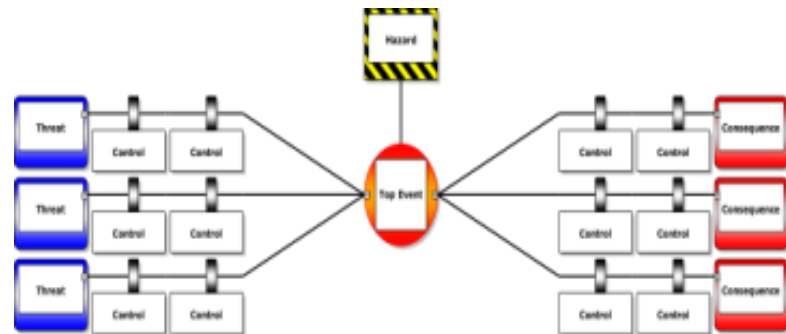
2014 Bow Tie set up : coordinate operational divisions

- ✓ Help divisions describe their own risk-based processes
- ✓ Coordinate the bowties (UOS = threat) at the corporate level to make sense

Ground Ops process



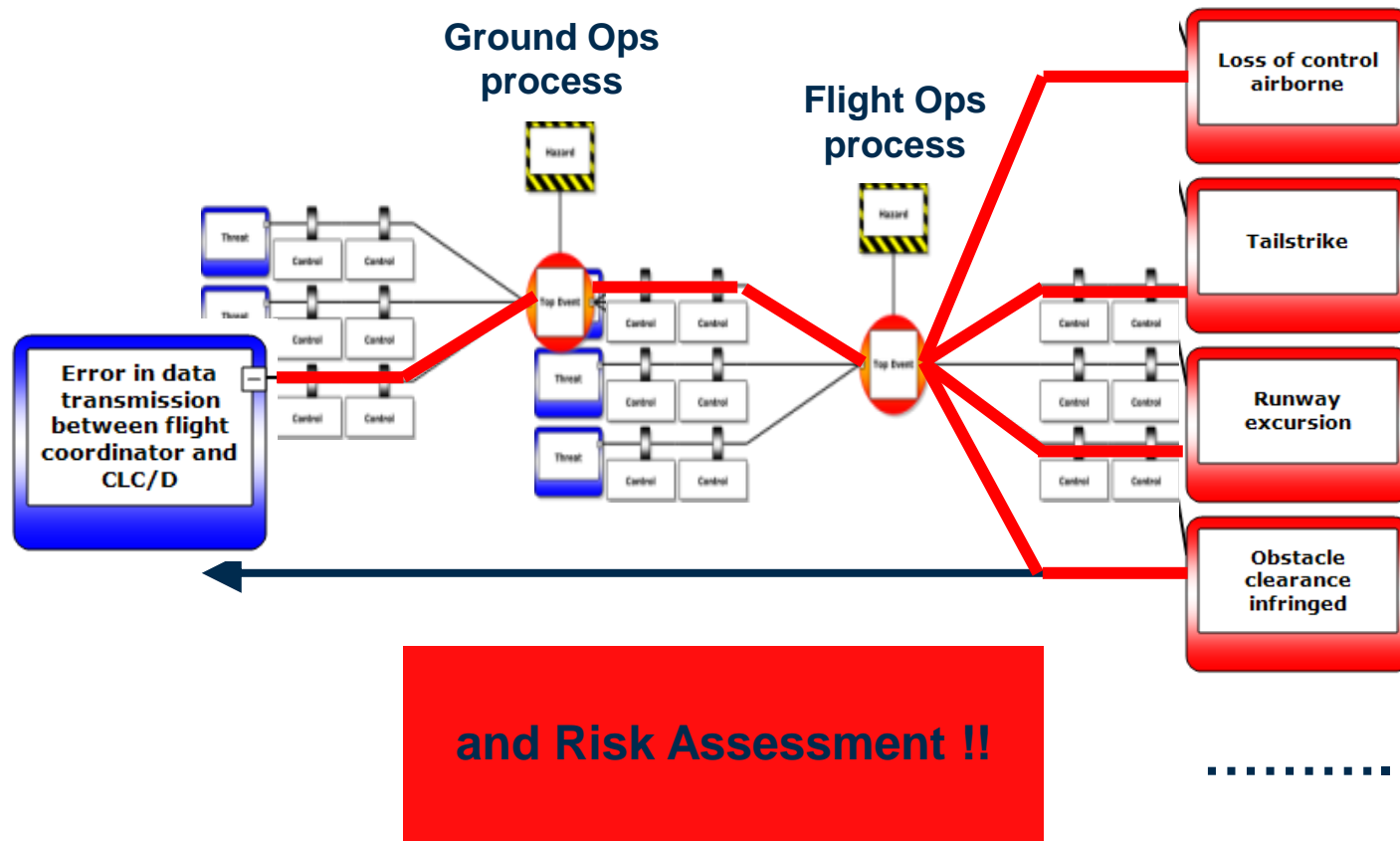
Flight Ops process



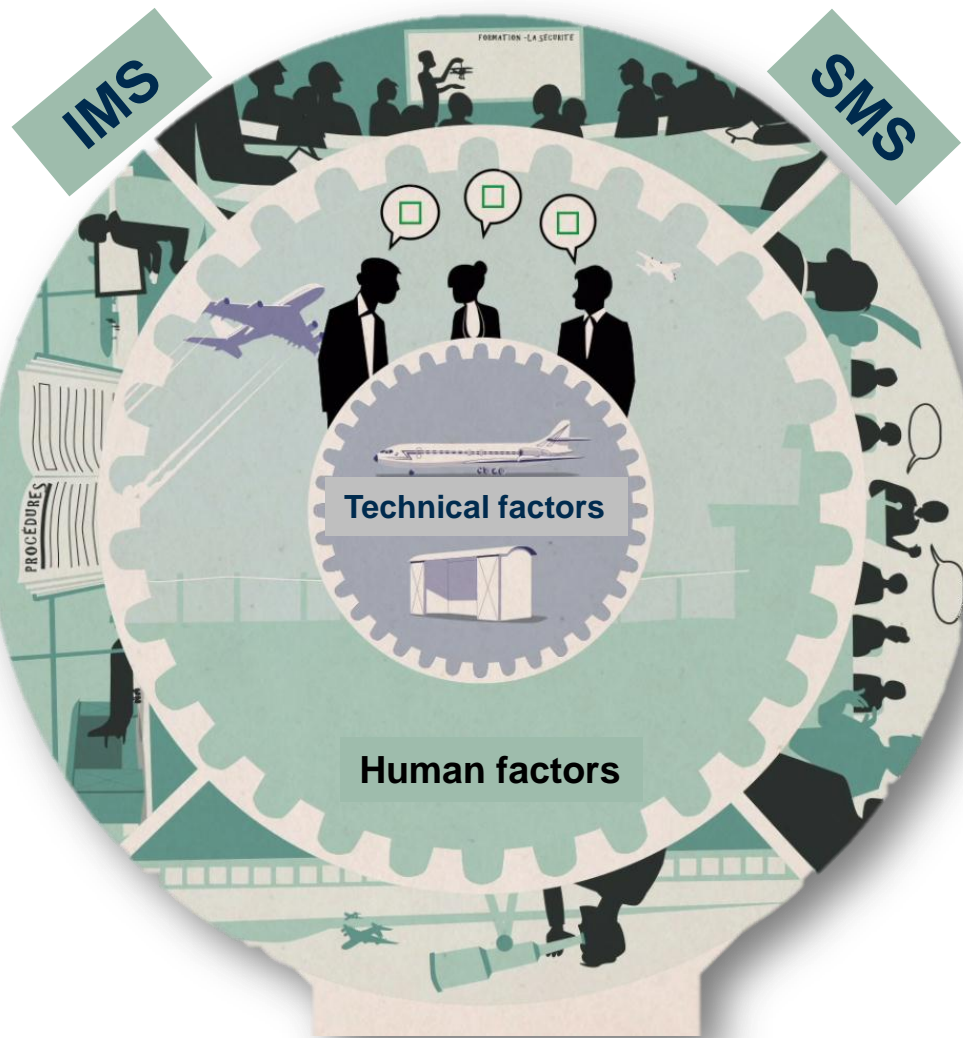
LDS / NOTOC not reflecting actual loading
at doors closed

Take Off misconfiguration or outside
performance assumption

Facilitate safety culture and safety communication



eCARE New Generation 2014-15



- Bow Tie
- Barrier management
- Facilitated analysis
- Flight safety lagging and leading indicators
- Fully integrated ERC
- Full cooperation (Arms, ETQ, Bow Tie XP and you !!! ...)