

Safety Risk Management Automation

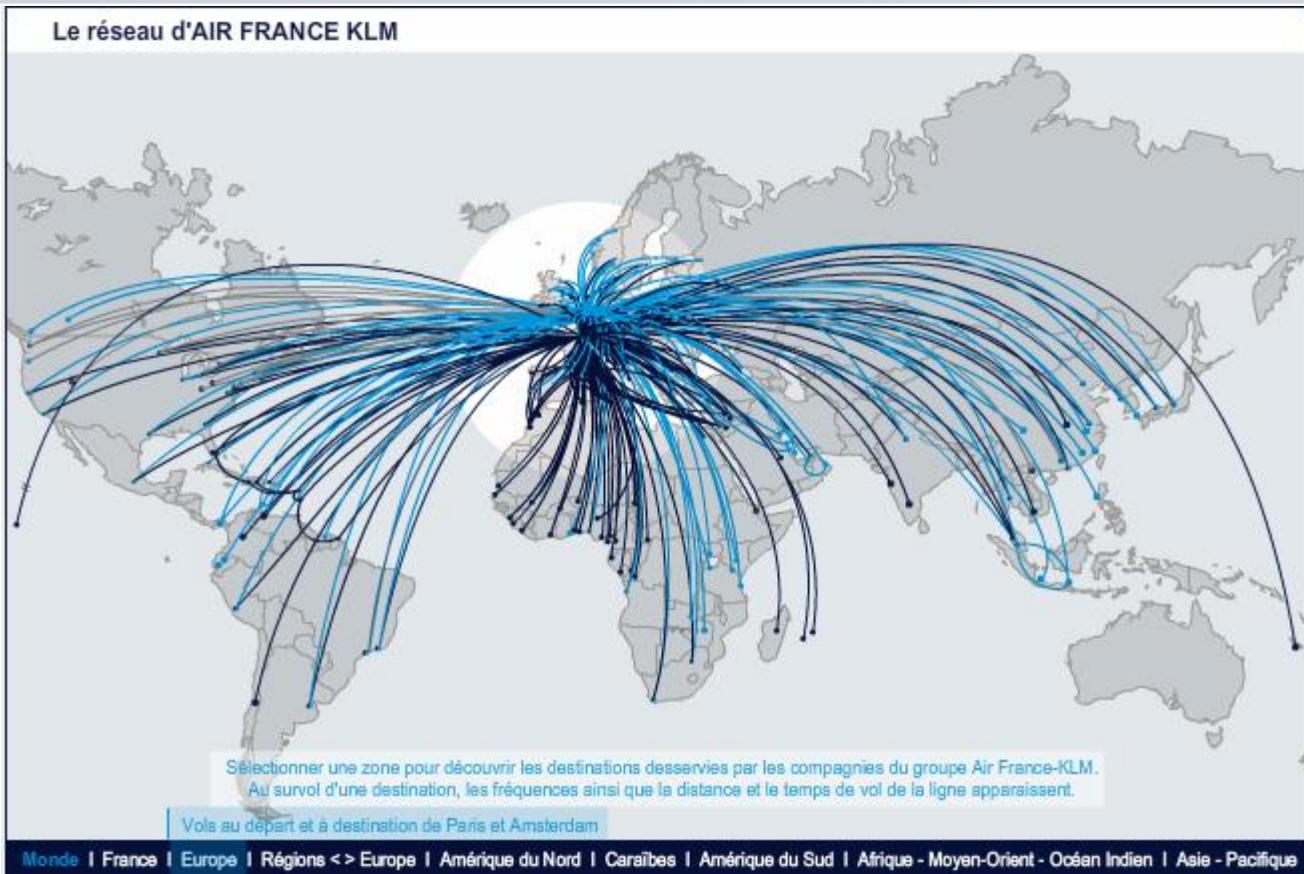


***SMS and Risk
assessment
automation***

SMICG industry day
Bern - may 16th

Air France key figures 2013

Wordwide network



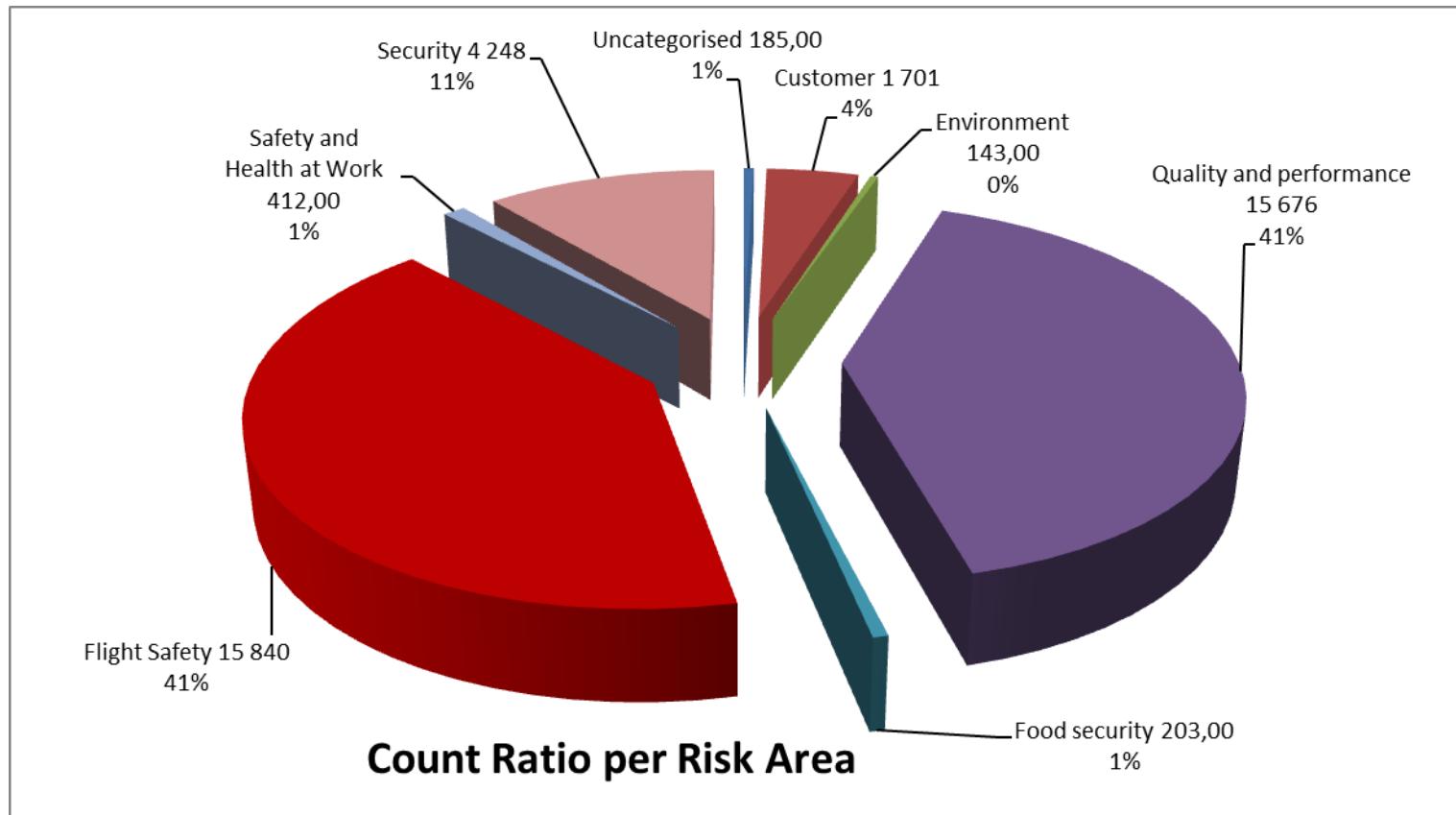
- **78 millions passengers**
- **800 flights per day**
- **69 000 employees**
- **242 aircraft**
- **243 airports (AF/KL)**

AIRFRANCE

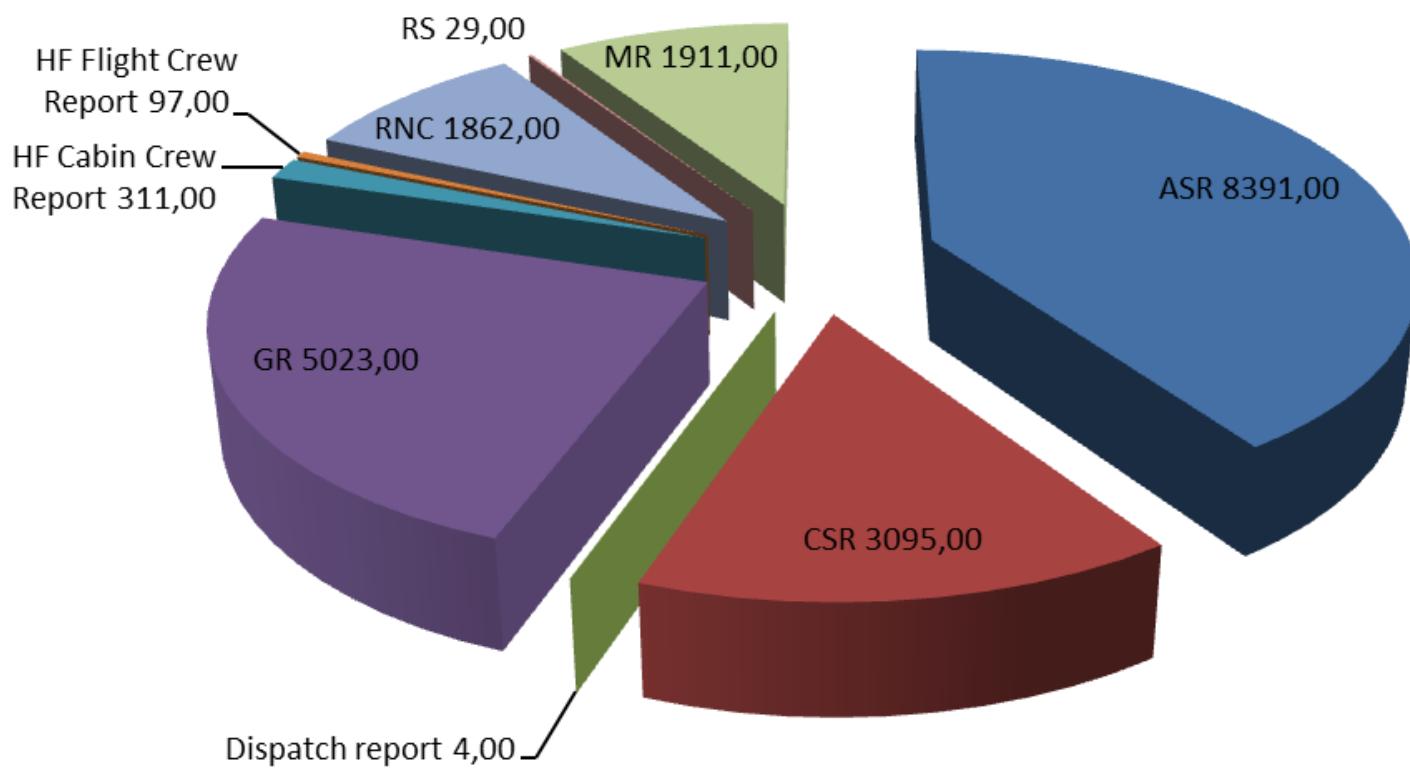
Integrated Management System Reports 2013

36 000 Reports

15 000 Safety Reports



Safety reports 2013 by origin



- All involved (Safety Culture)

- ✓ IMS or SMS

- Participative dimension

- ✓ One common reporting tool

- Be reactive

- ✓ Investigation, analysis, corrective action, feedback

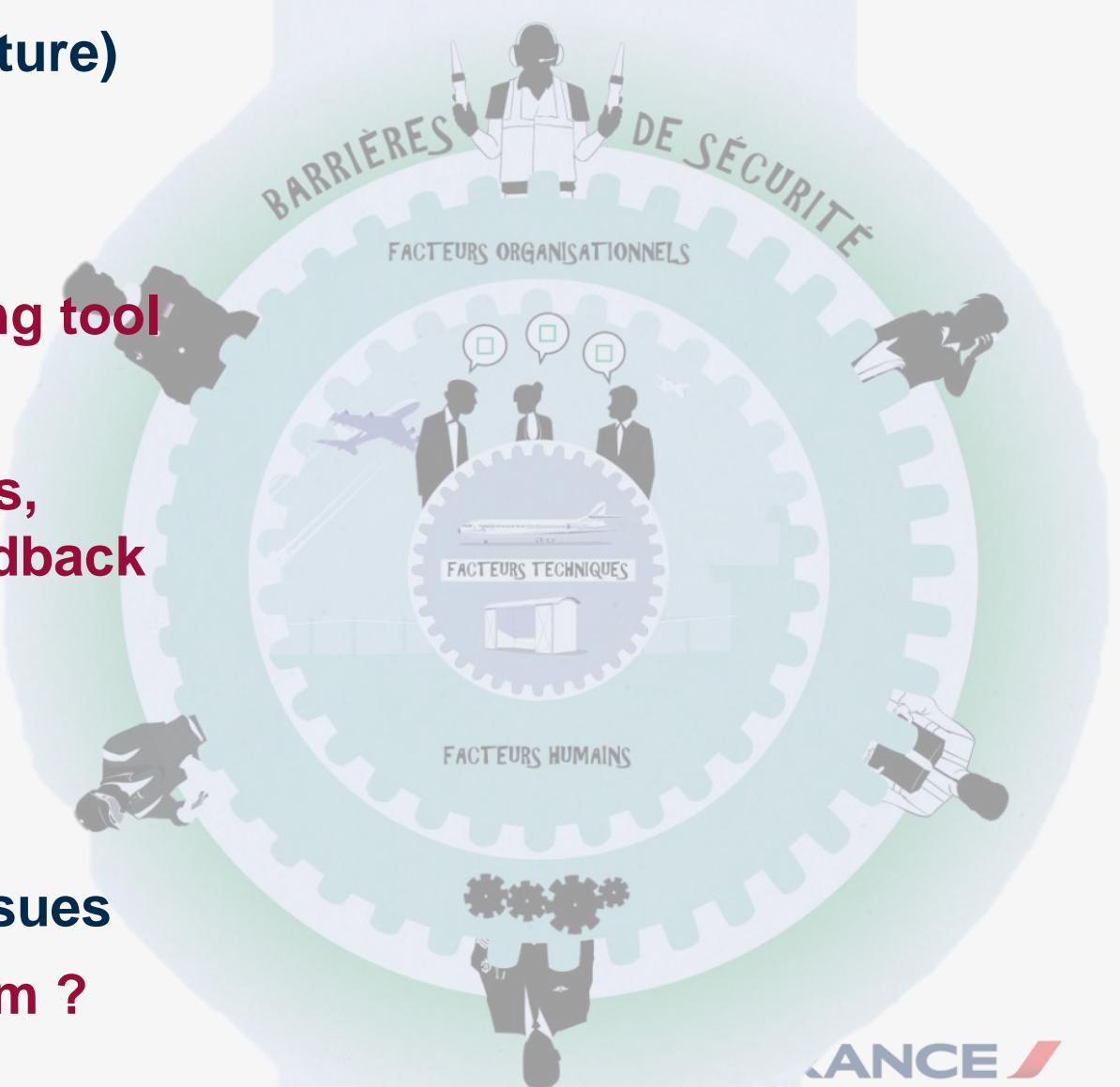
- Be proactive

- ✓ Safety barriers

- ✓ Risk model

- Risk factors – Safety Issues

- ✓ How to anticipate them ?



EtQ...

We Care...

Reliance...

ICARE

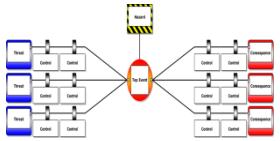
eCARE

Challenges raised with eCARE implementation

Define a common process between Ops Divisions

Define a common risk model

Risk Management Process



Continuous Improvement

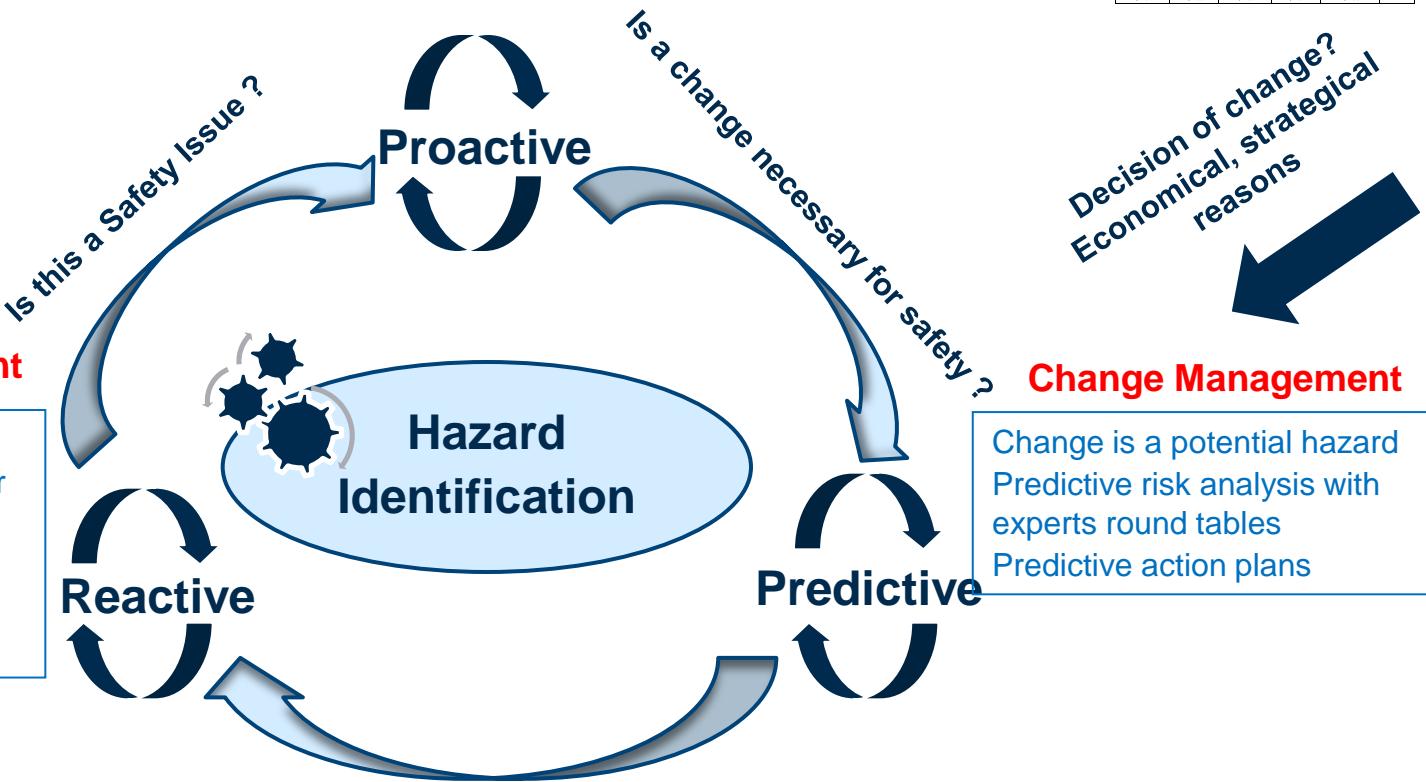
Barrier management with Bow Ties (leading indicators)...coming soon
 Safety surveys considering Safety Issues with actual hazard
 Proactive action plans

Probabilité d'accident	Très probable	Probable	Peu probable	Très peu probable	Improbable
Négligeable	Secure	Secure	Secure	Secure	Secure
1.E-01	Monitor	Monitor	Monitor	Monitor	Monitor
1.E-03	Stop	Stop	Stop	Stop	Stop
1.E-05	Stop	Stop	Stop	Stop	Stop
1.E-07	Stop	Stop	Stop	Stop	Stop
1.E-09	Stop	Stop	Stop	Stop	Stop
1.E-10	Stop	Stop	Stop	Stop	Stop

Occurrence Management

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

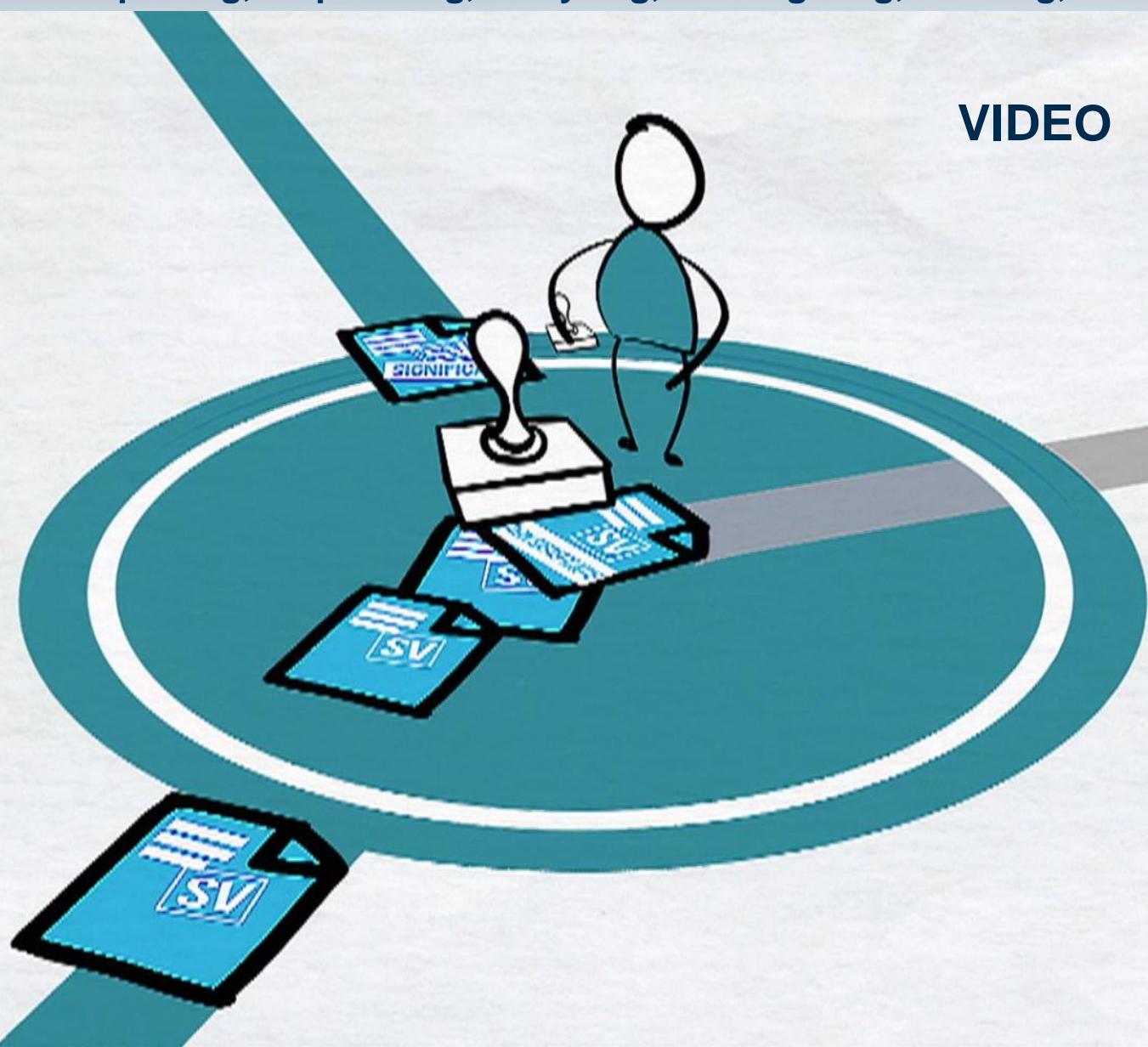
Question : Quelle est l'efficacité de l'empêchement entre l'événement et le résultat potentiel accidentel ?				Question : Si l'événement n'a pas abouti à un accident, quel est le résultat le plus probable ?			
Effectif	Unifié	Minor	Major	Effectif	Unifié	Minor	Major
50	100	50	250	Causes accident	Lois d'accident ou réglementation	Accident majeur	Accident majeur
10	20	10	50	Causes accident	Lois d'accident ou réglementation	Accident moyen	Accident moyen
2	4	2	10	Minor accident	Minor accident	Minor accident	Minor accident
1				No accident	No accident	No accident	No accident



Occurrence management process

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

VIDEO



Link between Reactive and Proactive process

Occurrence reports management

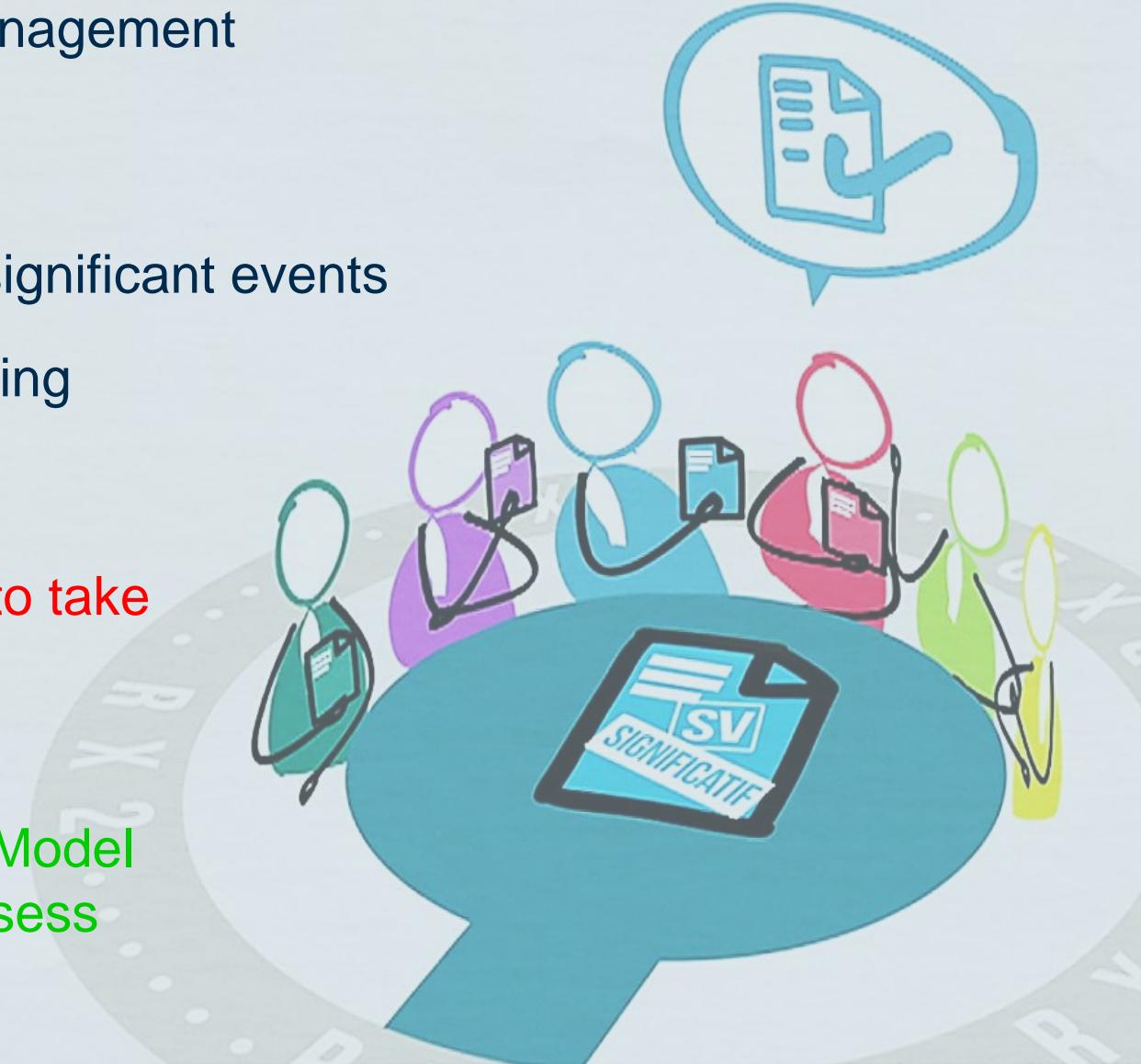
- in each division
- transversal

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

Occurrence Reporting # REPORT-2014-008380

Draft Dispatch Analysis **Awaiting Closure** Closed

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 **Assigned Analyst (Flight Safety)** **Analysis completed (Flight Safety)**
 Taken into account by : MATTHIEU COLAS Yes No

Environment **Assigned Analyst (Environment)** **Analysis completed (Environment)**
 Taken into account by : Yes No

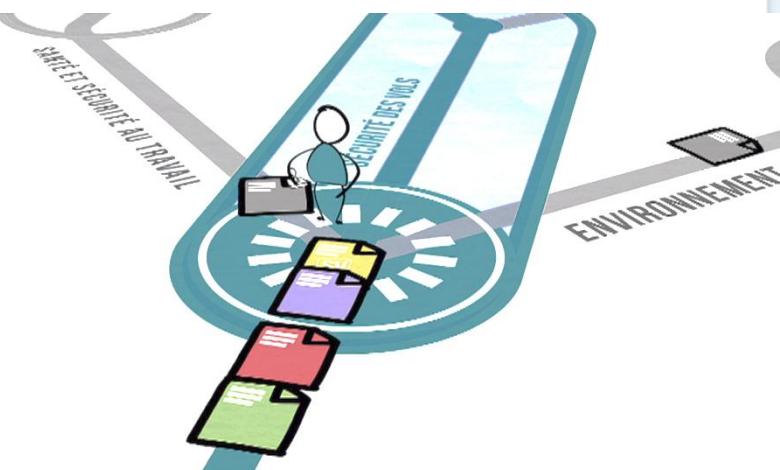
Occupational Safety **Assigned Analyst (Occupational Safety)** **Analysis completed (Occupational Safety)**
 Taken into account by : Yes No

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 irrelevant

RX2

OACI Annexe 13

Attachments

Risk assessment required

Safety expert round table

Corporate weekly meeting (RX2)



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

Risk tolerable : Risk analysis necessary

Risk acceptable : Data register

Event register and global risk assessment

- ✓ Unsafe state
- ✓ Control Barriers
- ✓ Undesired event
- ✓ Recovery Barriers
- ✓ Consequence
- ✓ Systemic Risk Level
(estimated)

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

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

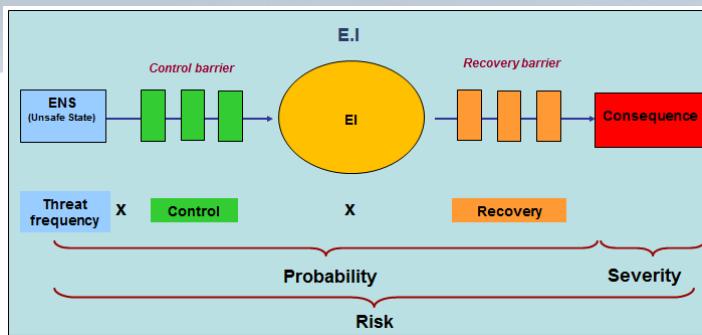
Undesirable Event - EI (Flight Safety): EI Occurred? Yes No

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 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 contrôle Improve 56

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

Comments (Flight Safety - Analysis)

Attachments [+ Add Record](#)

Action Plans

Investigation in eCARE

The screenshot shows the SAP NetWeaver interface for creating a new investigation. The 'Problem Statement' tab is selected. The 'Investigation Type' dropdown is highlighted with a red circle. The dropdown menu lists the following types:

- PI rouge
- Enquête interne
- Enquête simplifiée
- Complément d'enq sur événement
- EDS Synthétique (provisoire)
- EDS Changement (provisoire)

- ✓ 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	Evénement, analyse et mise en perspective	ERC	Domaine de risque	Evén. 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 SAW 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'escale.	
06/05/14	ER (Rapport d'événement)	REPORT-2014-014944	MCOS 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 +193 MACTOW +165	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 côté 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 côté piste ou passage selon les soins et difficultés du vol. Le vol présence d'un CEP côté passage en raison d'une survête et de difficultés à l'atterrissement. Suivi MCOS, clos RX2 CEP chargé et lié à l'ASR.	
06/05/14	ASR	REPORT-2014-015854	OADC A320 FGRXG AF4387 VCE-NICE : 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	Portes et doublages au sol	Yes	Improve	L'OSV et le chef Pilote Base Nice ont contacté l'équipage. Entretien CSV	
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 BANVO wpt, spanish atc advises us that they were expecting us to fly via MOLIN, HJ2 and SYL. After coordination with Sevilla atc we were allowed to follow our initially intended route via CJN, ANZAN, BLN, MOLIN, GALTO.	50	Perte de contrôle 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.	
06/05/14	ASR	REPORT-2014-015118	OADC A321FGTAL AF1983 PRG-CDG : wrong SID inserted in the FMS Crossing PR619, the aircraft turns left according to the FMS programmed (BALTU 2D) but the clearance is on BALTU 2E. Immediately the departure control asks the crew why aircraft turning left and requires to maintain present heading 330. The crew identifies a mistake of FMS programming and apologizes. The crew didn't notice any 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 RETIENUE EN ASR TERRAIN à rapprocher S17@6	
06/05/14	ASR	REPORT-2014-015717	OADC/BLGQ : A319 FGRXE AF1527/30APR CDG-CDG : COUPURE MOTEUR SUITE BAISSE D'HUILE GTR2 ENG 2 LO PRESS and ENG 2 SHUT DOWN occur and procedures are applied. MAY DAY sent to ROMA control and crew decides 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	
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 BALTU 2D SID instead of BALTU 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 RETIENUE EN ASR TERRAIN à rapprocher S17@6	
06/05/14	ASR	REPORT-2014-013882	OADC A320 FGHQI AF7837 LYS-NICE : 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'EXPÉRIENCE VERS L'ÉQUIPAGE : 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 Evénements Mensuel) : ERREUR INSERTION FMS / PROJET DOC	

Time boxing project and now on

2 years...

AF only Safety model

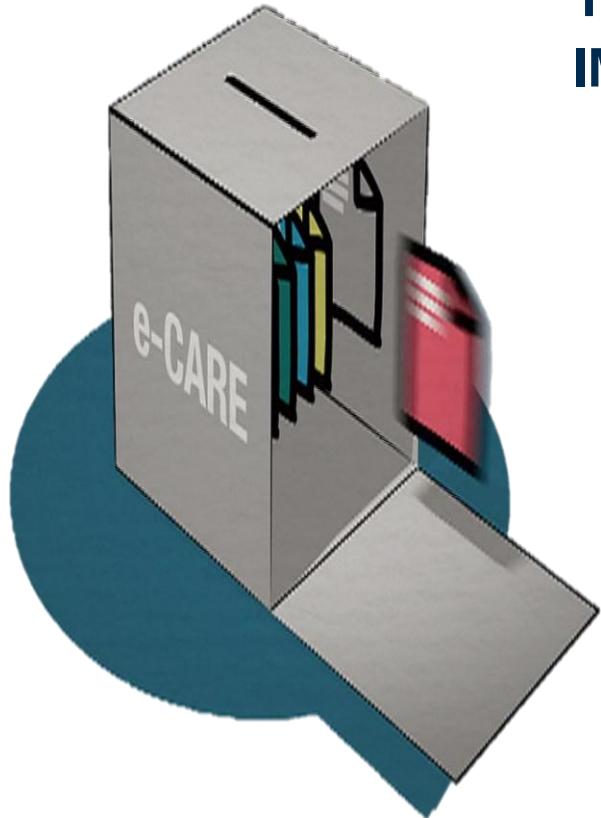
Training

Too rich...

Reactive, not enough proactive

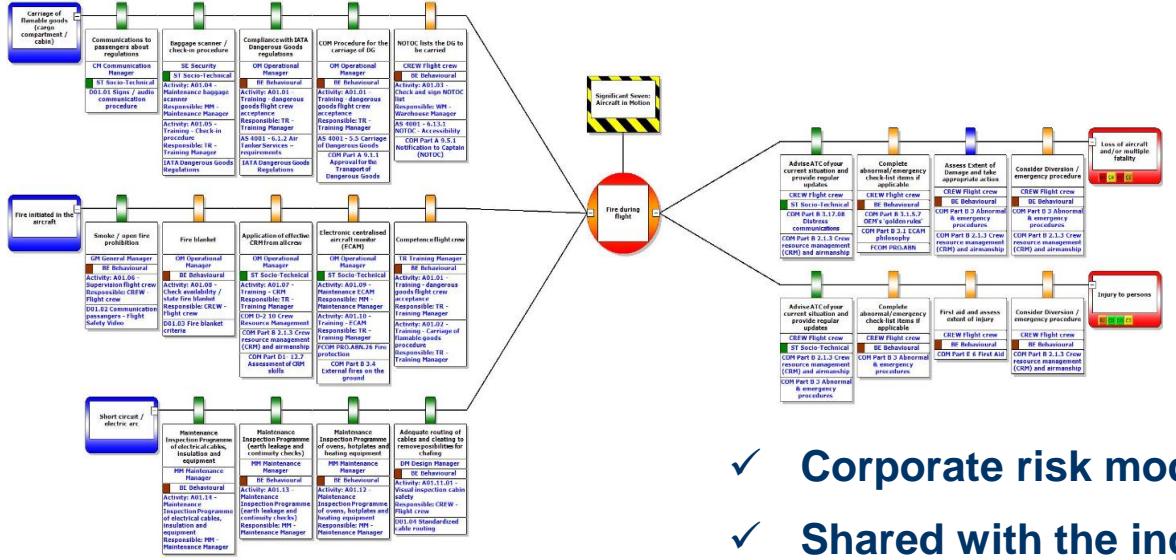
Transversal

IMS orientated



Coming soon...

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



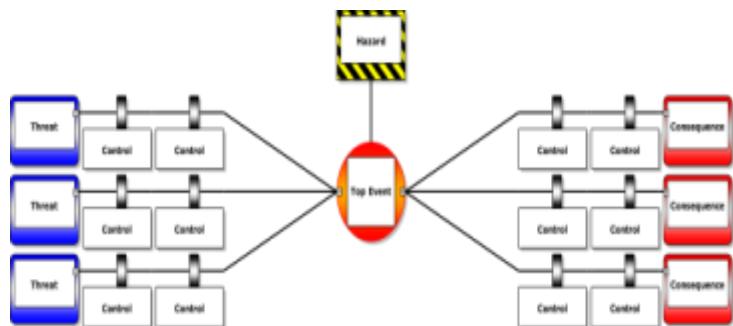
Bow Tie Model Our expectations...

- ✓ 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

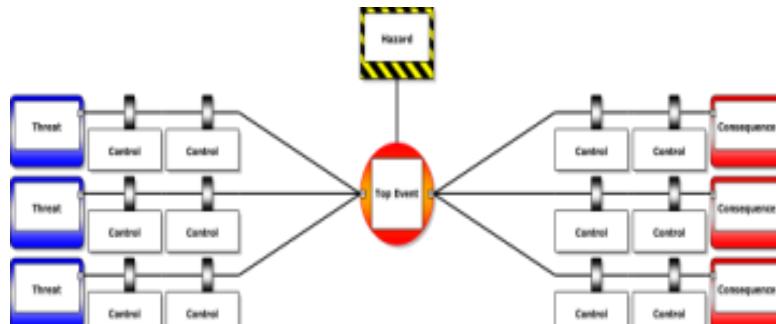
2014 Bow Tie set up : coordinate operational divisions

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

Ground Ops process



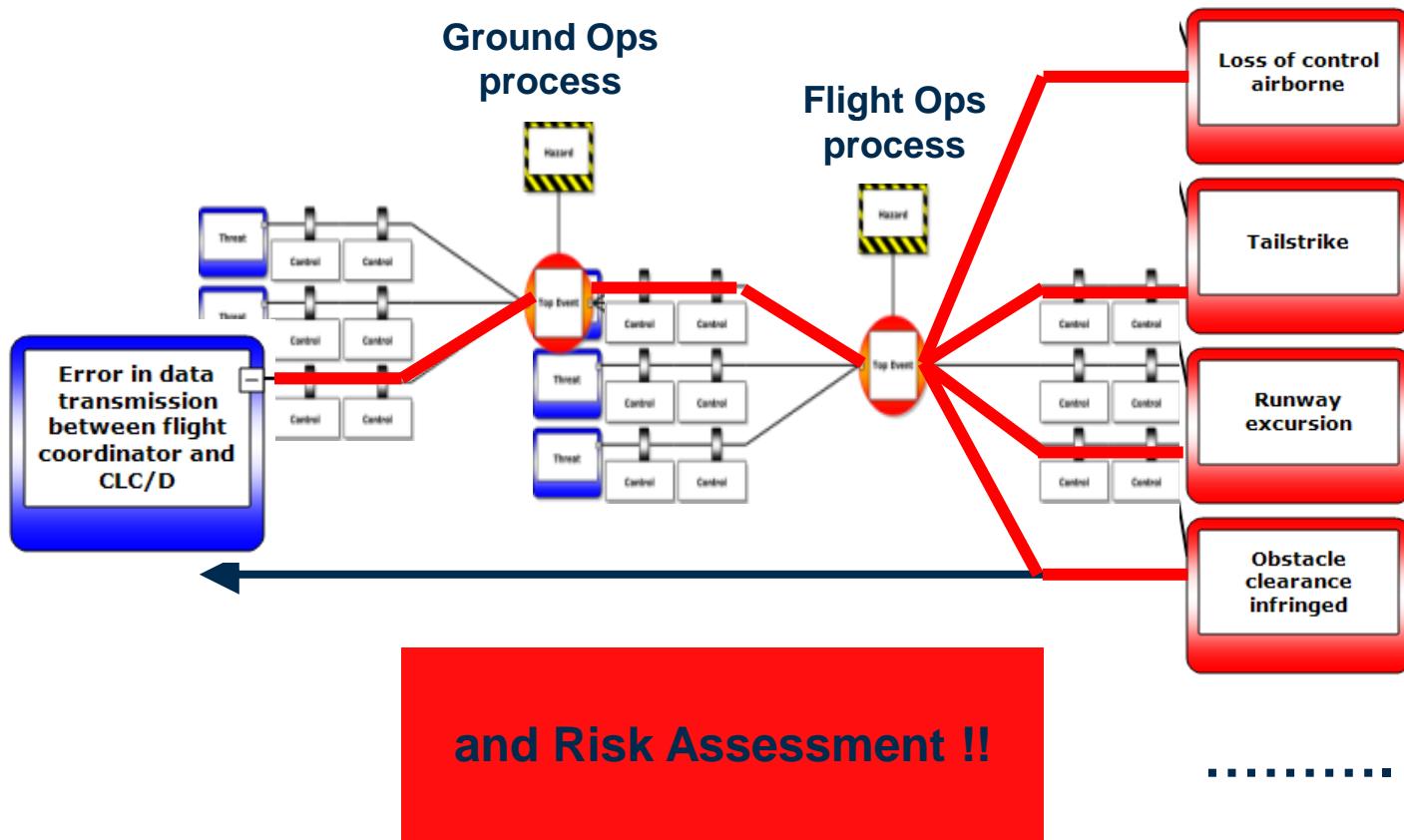
Flight Ops process



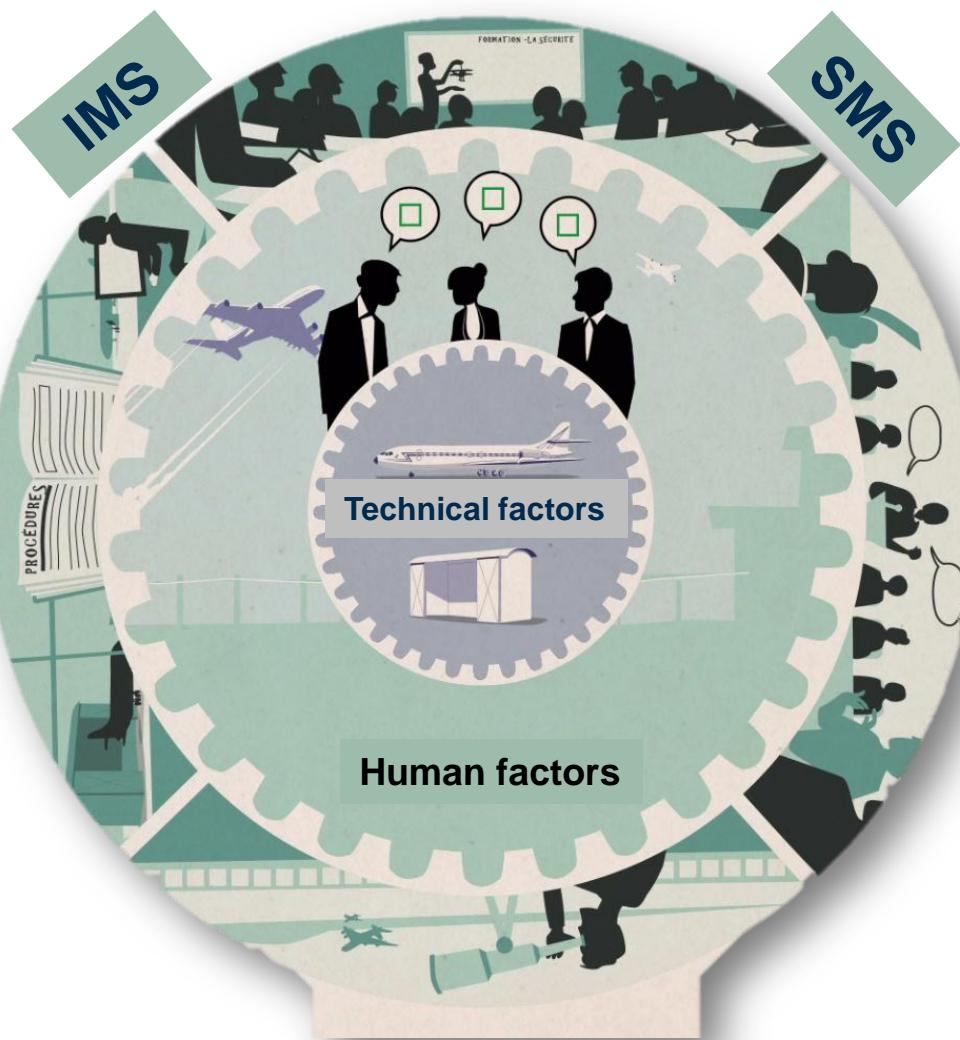
LDS / NOTOC not reflecting actual loading
at doors closed

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 !!! ...)