
# MAINTENANCE LOSA : SAFETY CULTURE'S PROBE & SPARK.

Flight Safety Foundation | 71st Annual International Air Safety Summit

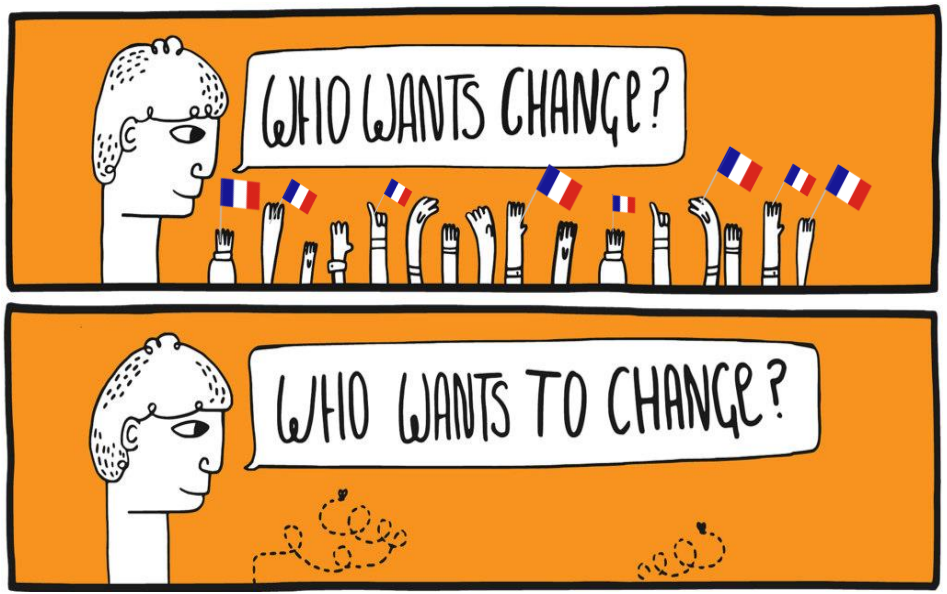
Christine ZYLAWSKI

**November 2018**

# MAJOR CHALLENGE
## MLOSA IMPLEMENTATION

Major Challenge ?

**Change Management.**



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# MAJOR CHALLENGE

## MLOSA IMPLEMENTATION

**Involving Management & Labor Unions**


**Enrolling Volunteers**

**Training Observers**

**Non-punitive**

**Informing workforce**

**Targeted enhancements**


**Systematic observations**

**Peer to peer observations**

**Secure & Confidential**



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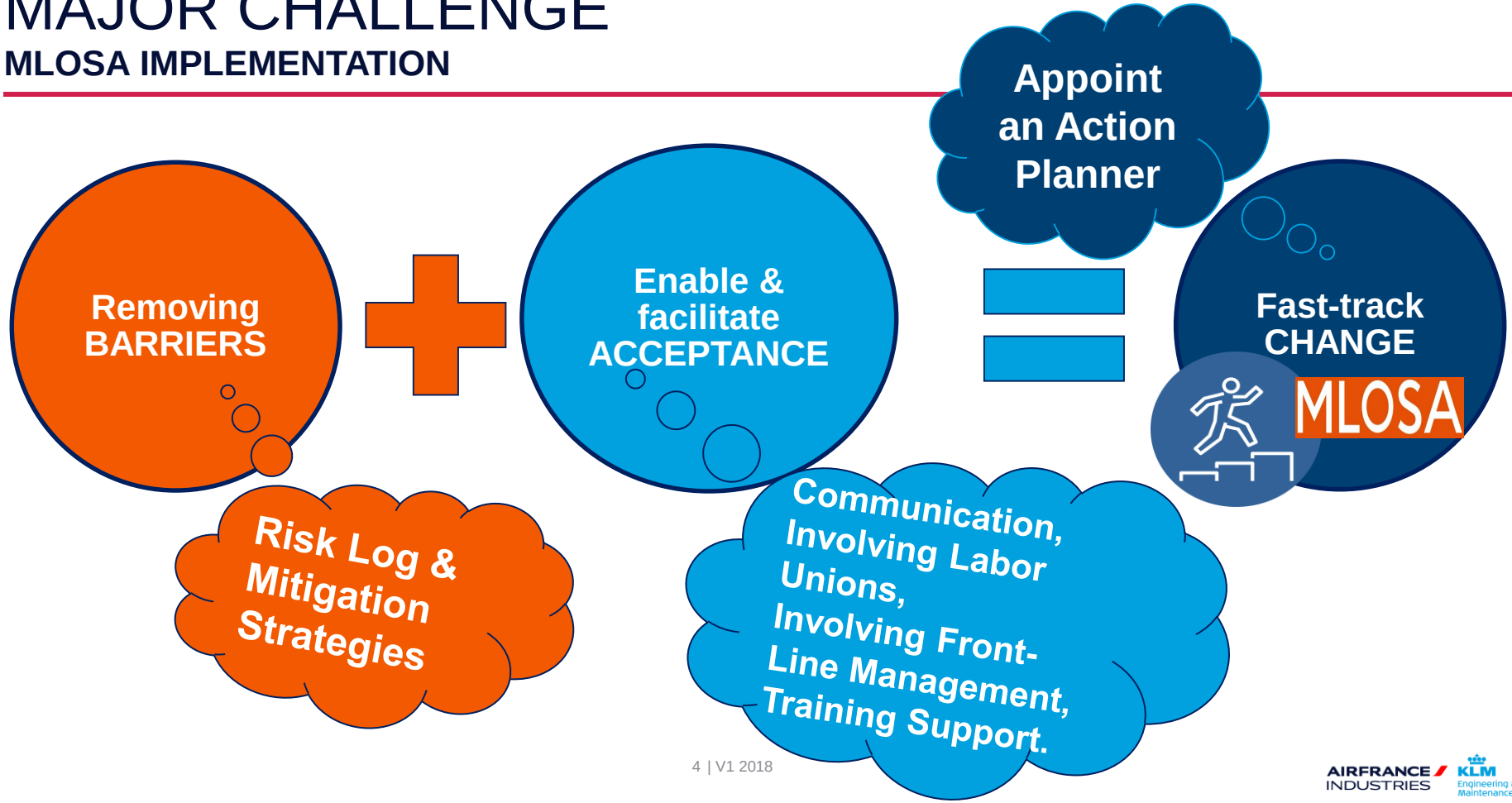
# MAJOR CHALLENGE

## MLOSA IMPLEMENTATION



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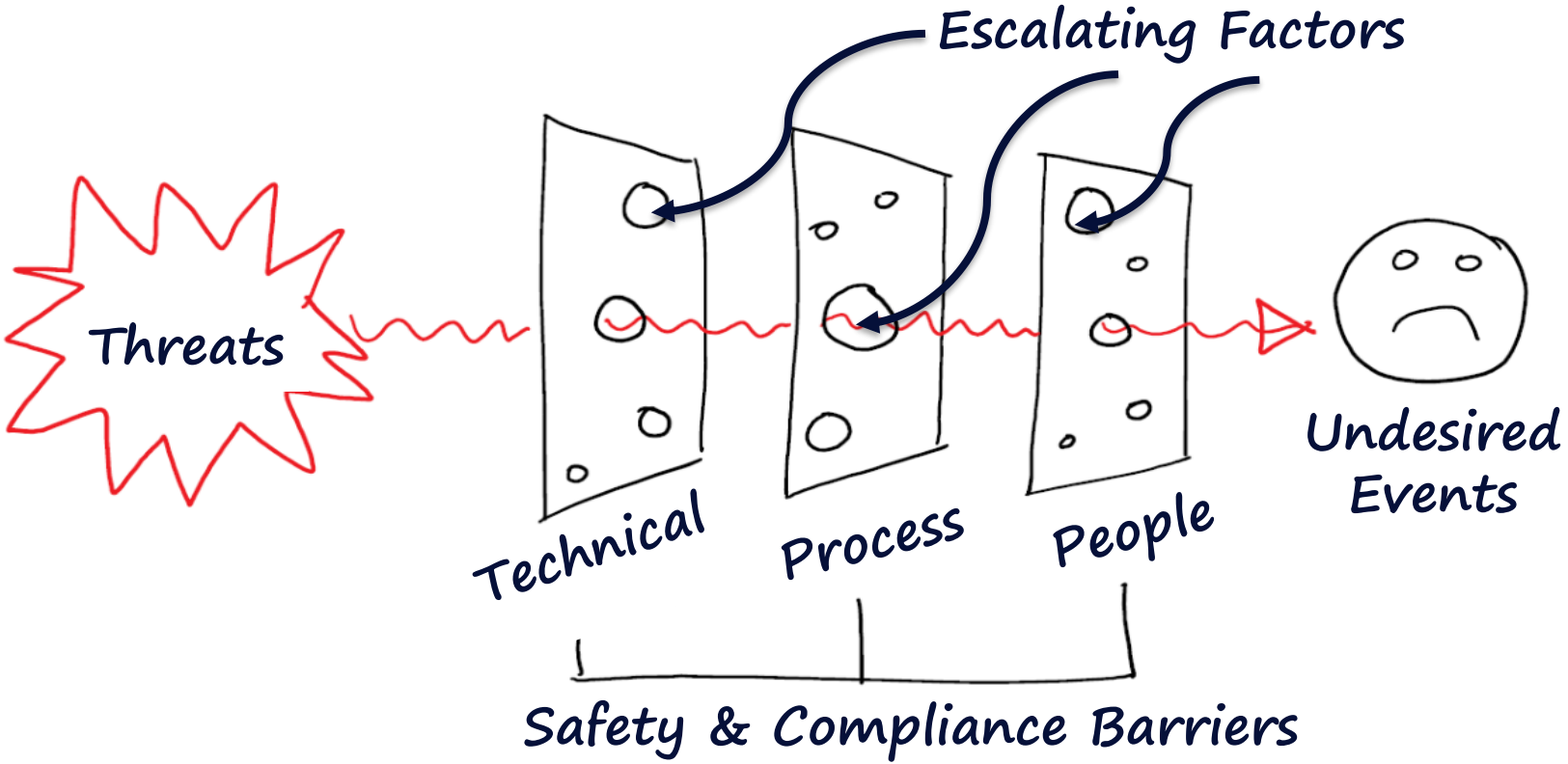
# PREDICTIVE APPROACH

## HOW MLOSA IS ENHANCING OUR SMS ?



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# PREDICTIVE APPROACH

## HOW MLOSA IS ENHANCING OUR SMS ?

### Safety Culture Promotion

- **Confidence climate encourages transparency**: 120 Occ. reports/1000 flights.
- Upholding a safety climate to **promote good practices and safe behaviors.**
- Adherence, collaboration & participation to **new safety initiatives.**

### Collaborative Actions between Safety & Compliance

- MLOSA data **fuels our RBO program.**
- Improving threats identification & correlation.
- Safety Alert : new media.
- Cross-BU's improvements.

### Moving forward

- Adapting content to Millenniums to learn in a way that they can assimilate & gain in competence.
- **Competence based training programs**.
- **Safety toolbox talks.**
- New Corporate Safety Culture Program.



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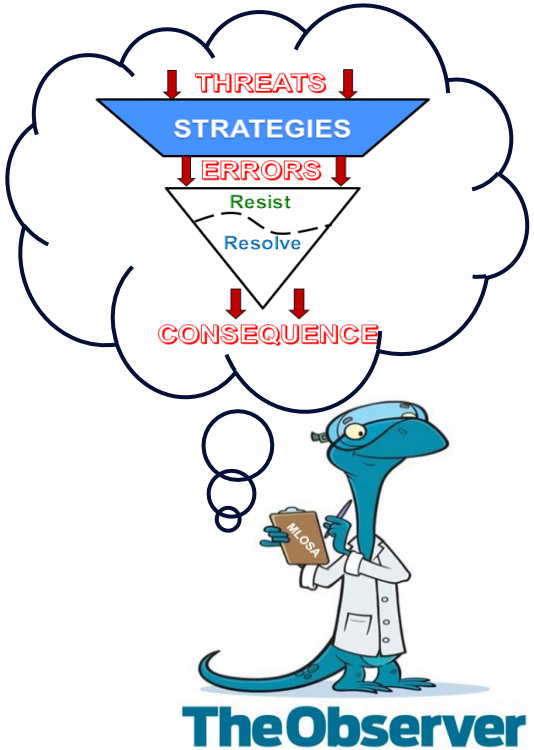
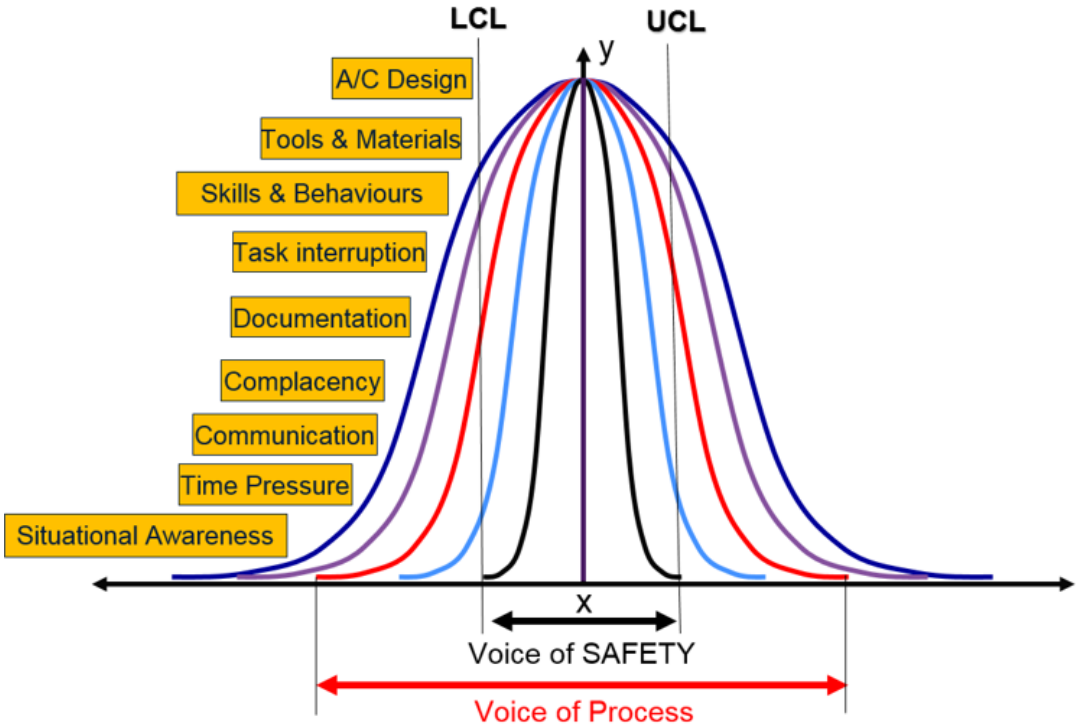
# ANALYZING MLOSA DATA

## GETTING ACTIONABLE SAFETY KNOWLEDGE



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# ANALYZING MLOSA DATA

## GETTING ACTIONABLE SAFETY KNOWLEDGE

**Field observation**

**Statistical Problem**

$$Y = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_3 * X_3 + .... + \beta_n * X_n + \varepsilon$$

**Statistical Solution**

$$Ln(\frac{p}{1-p}) = \text{logit}(p) = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_3 * X_3 + .... + \beta_n * X_n + \varepsilon$$

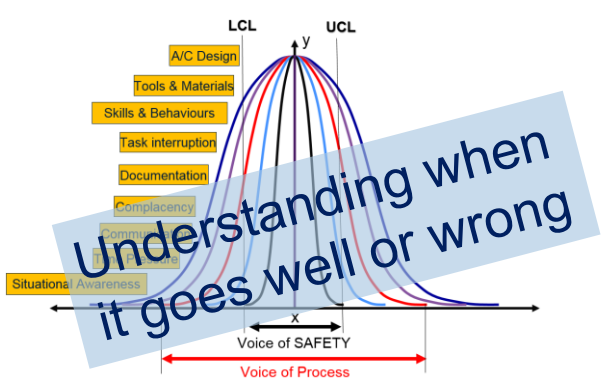
**Field Solution**

**Define**

**Measure**

**Y**

Contributors to Variability




**Analyze**

**Improve**

**Xs**

**Control**

**Target:**

**Y = f ( Xs )**



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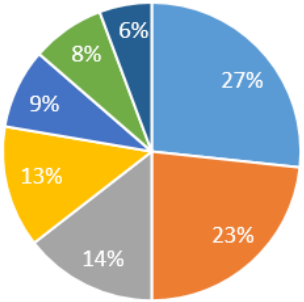
# ANALYZING MLOSA DATA

## GETTING ACTIONABLE SAFETY KNOWLEDGE

## DUMMY FIGURES

- THR-118 - Lack or improper installation
- THR-107 - Incorrect operating configuration
- THR-058 - Failure or damage in service
- THR-047 - Disregard of limitation (part, inspection, visit)
- THR-114 - Insufficient reliability / performance of a family of elements
- THR-038 - Deterioration, Contamination / foreign object
- THR-113 - Installation of a unauthorized reference




**Binary logistic regression of Error Y`**

| Regression Source | DL | Somme des carrés d'écart ajustée | Moyenne ajustée | Khi deux | Valeur de p |
|---|---|---|---|---|---|
| Threat #1 | 1 | 34,584 | 34,5835 | 34,58 | 0,000 |
| Threat #2 | 1 | 4,229 | 4,2285 | 4,23 | 0,040 |
| Threat #3 | 1 | 4,525 | 4,5246 | 4,52 | 0,033 |
| Threat #4 | 1 | 4,016 | 4,0162 | 4,02 | 0,045 |
| Threat #5 | 1 | 14,302 | 14,3023 | 14,30 | 0,000 |
| Threat #6 | 1 | 3,197 | 3,1973 | 3,20 | 0,074 |

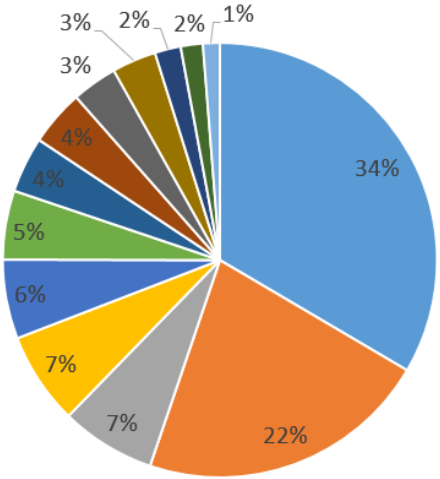
The deviance table contains the P-values for the regression inputs, both of which are less than 0.05 have a statistically significant effect on the process output. In other words, if the P-value is less than 0.05, then the input variable predictor does influence the process output.

Each term of the deviance table has a Chi square value for the like hood ratio test. Chi square value is the test that determines whether a term has an association with the response. Minitab uses Chi square value to calculate the p-value.

Regression Equation P(1) = exp(Y')/(1 + exp(Y'))

Y' = 2,960 + 2,650 Threat#1 + 0,937 Threat #2 + 1,109 Threat #3 + 0,913 Threat #4 + 1,646 Threat #5 + 1,007 Threat #6

- EF-394 - R: Inadequate tools/materials/fixtures/GSE/ IT
- EF-381 - P: Lack of situational awareness / routine / complacency
- EF-391 - A: Failure to follow-up maintenance procedure / policy
- EF-389 - A: Communication procedure not followed
- EF-395 - R: Inadequate/unavailable documentation/manuals
- EF-396 - R: Inadequate third party support
- EF-383 - E: Inadequate planning/order/shift
- EF-380 - P: Lack of experience / inadequate skills
- EF-321 - Skill unsuitable or insufficient
- EF-384 - E: Distractions/interruptions/pressure
- EF-390 - A: Improper quality/information control procedures
- EF-099 - Documentation unsuitable, erroneous, inaccessible ...
- EF-387 - E: Poor system interface / complex aircraft design



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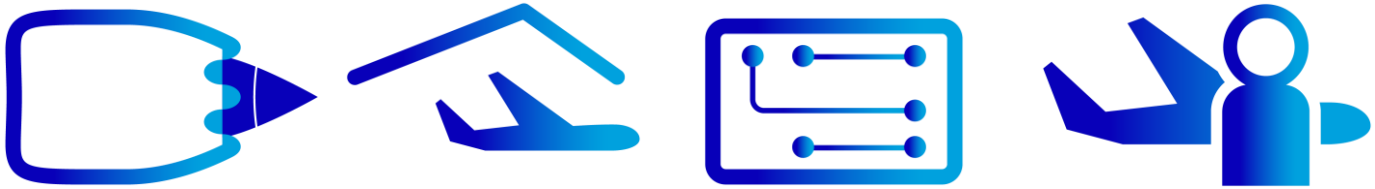
# ANALYZING MLOSA DATA

## GETTING ACTIONABLE SAFETY KNOWLEDGE



Engines Airframe Components Line maintenance

Mx/E. Knowledge / Skills

Mx/F. Individual Factors

Accueil Toolpad

Mx/A. Information



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# ANALYZING MLOSA DATA

## GETTING ACTIONABLE SAFETY KNOWLEDGE

**Changing Personnel Skills**

*new aircraft technology, new regulations, digital transformation.*

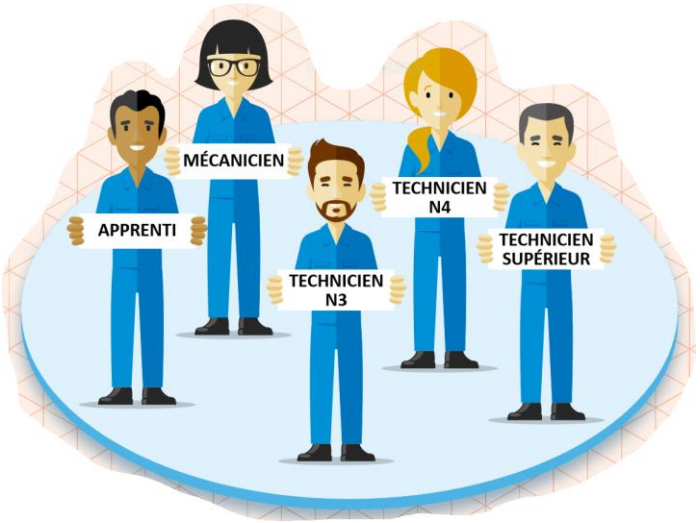
**Preserving & spreading skills**

*anticipating workforce retirement, intergenerational knowledge transmission.*

**Developing Apprenticeship**

*welcoming younger generations to prepare for the future.*

**Competence Assessment Program.**



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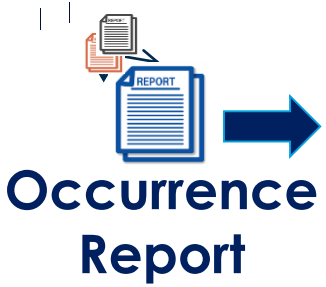
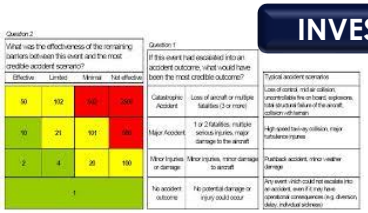
# SAFETY PERFORMANCE

## INTEGRATING DIFFERENT SOURCES OF DATA




Occurrence Report

Event Analyst



INVESTIGATION

Event Review Committee

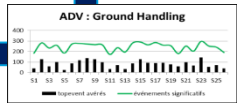
Audits

MLOSA

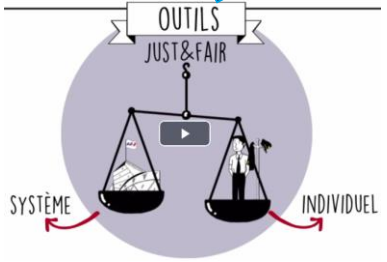
(PR, CSR, GR, REX…)

Safety Intelligence (External)

DWH SMS


Local Safety Issue




Safety Assessment Group

Systemic Safety Issue

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Systemic Safety Study

Statistical Analysis

Systemic Analyst



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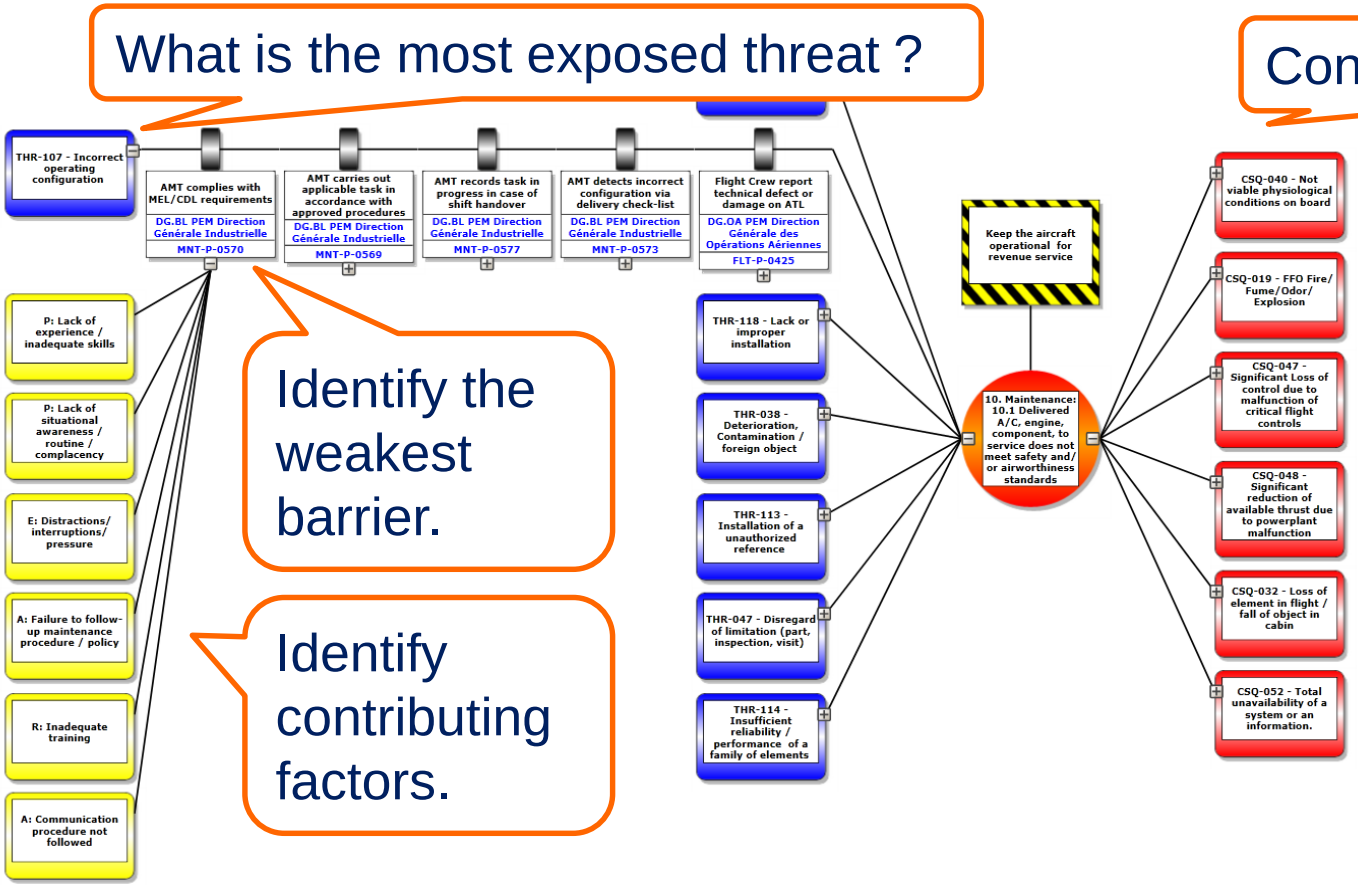
# SAFETY PERFORMANCE

## INTEGRATING DIFFERENT SOURCES OF DATA

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# SHARING MLOSA DATA

## SHOULD WE SHARE MLOSA DATA ?

- Should we share LOSA data ? Yes.
- How ? Start up collaborative workshops to address common issues & share best practices.
- Who ? Operators, Manufacturers, FAA.
- Topic ? “technical documentation” and “failure to follow procedures” issues. Enhancing technical contents, adapting it to new generations & integrating AMM to fit into new digital tools.



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# CONCLUSION

## Maintenance LOSA : Safety Culture’s Probe & Spark.

MLOSA

Safety Attitude

We think Safety-We act Safely



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# THANK YOU FOR YOUR ATTENTION

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