



SAFETY DATA
ANALYSIS SERVICES

PLUS Software Solution Processing Language Upgrades Safety Safety Data - CFH

Data Science in Aviation
2017 Workshop

29th September 2017



1. Background and objectives
2. *PLUS* Software Solution
3. They trust us...

Background and objectives



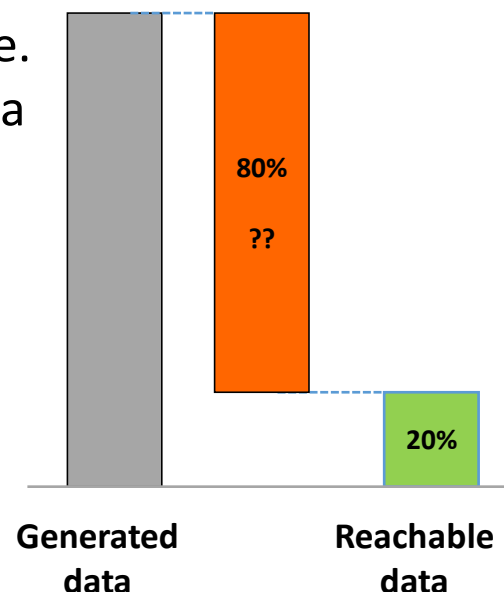
Data: an unexplored but strategic asset

- **Assessment in Aviation (DGAC – French Civil Aviation Authority)**

« Evolution of accident rates in air transportation: in 1972, 3 000 deaths for 500 million passengers, in 2012: 270 deaths for 3 billion passengers. **The progress in security will depend on the capacity to collect, structure, link together and analyse large volumes of safety data from various multilingual, unstructured sources.** »

- **80%*** of newly generated digitized data is not reachable.
Unanalyzed data can even exceed 95%* if historical data is taken into account.

- Large volumes of textual data are available and full of information but the data is unstructured
 - difficult to manage it manually
 - Integration of NLP techniques makes the textual mining easier



Background and objectives

Keyword based searches mislead experts



- **Monitor human fatigue is mandatory in aviation.**

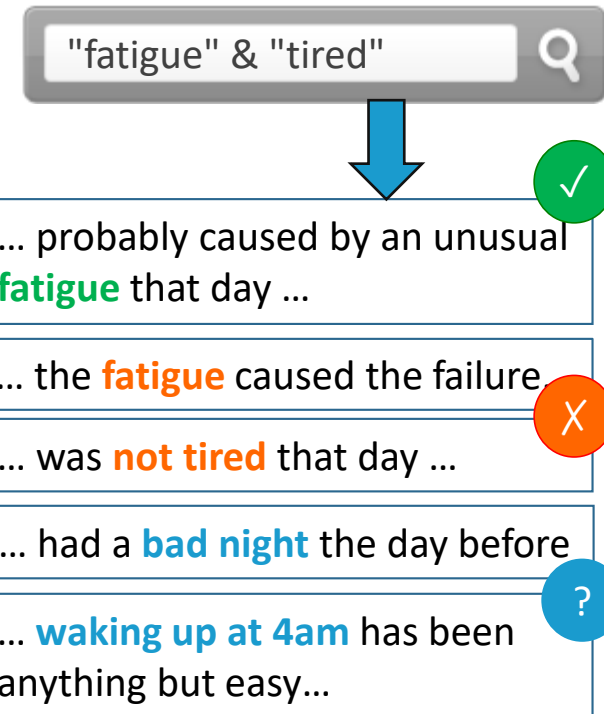
How to do it? How to recognize it in reports?

- Without NLP:

- Find relevant reports = find exhaustive right keywords
- However, there are:
 - **Noise**: Superfluous signal (ex: results include negations)
 - **Silence**: Missing signal. Results remain unreachable because of the linguistic variation to express a same phenomena

- With NLP:

- Model the linguistic expression of a particular dimension to help experts to find it in texts
- “fatigue” weight between 0 & 1 to identify if the dimension is present (strongly or not)

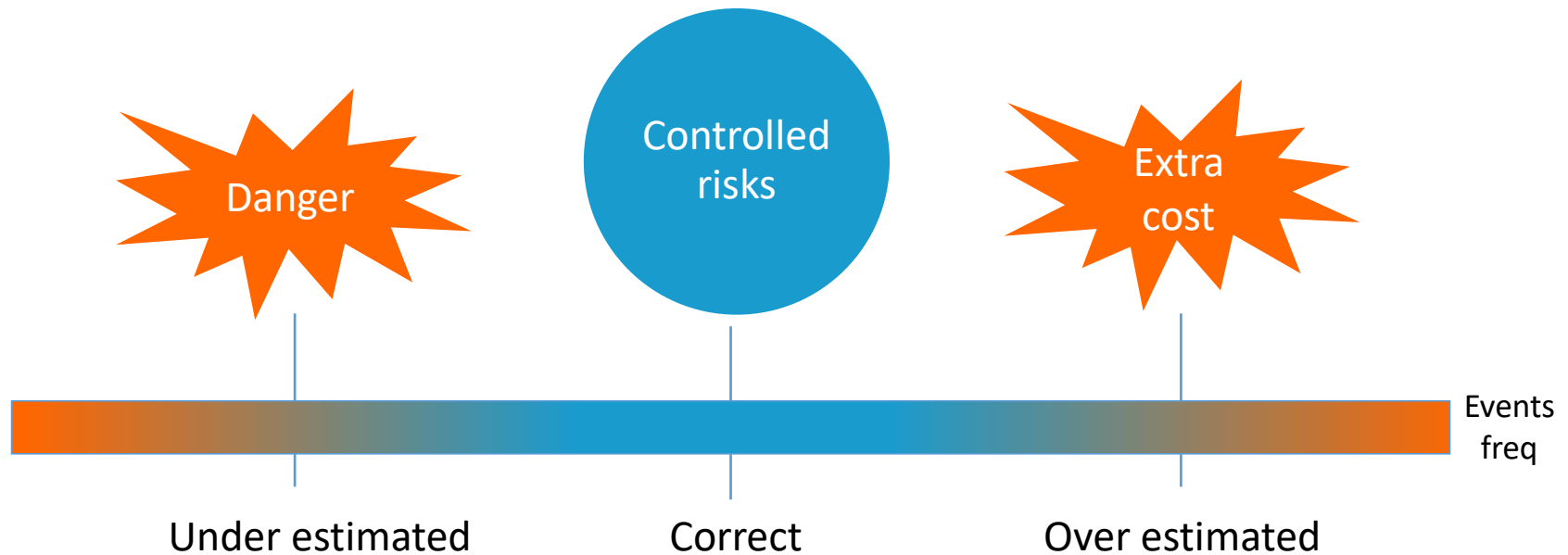




Background and objectives

Why is getting every report essential?

PLUS enables you to evaluate risk as close as possible to reality.

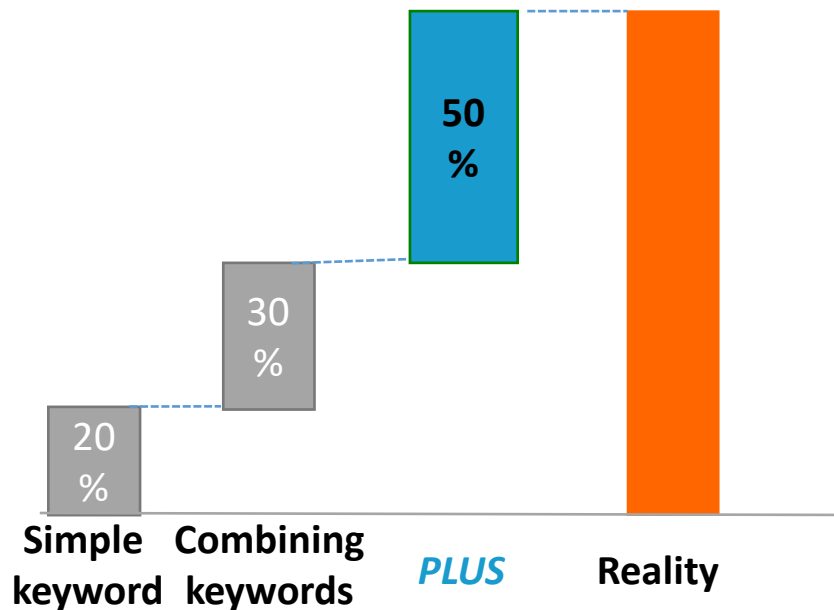


Background and objectives

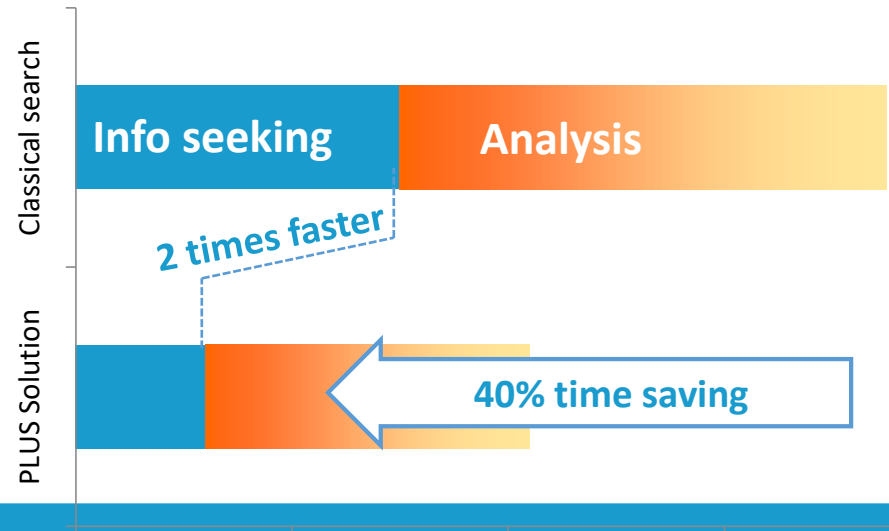
Feedback from users



- *PLUS* can help you find up to **50% extra data** compared to a classical keyword search.



- Increased productivity for experts



PLUS Software Solution



Natural Language Processing as the core brick

- Different kinds of linguistic issues are treated to deal with variations in texts:
 1. Syntactic variations and idioms analysis: *PLUS* handles the specificities of each language enabling searches to be more powerful and refined.
E.g.: *difference between English and French* : « *car* », « *an* », *etc.*
 2. Technical terms integration: Taking into account specific business technical terms is essential. *PLUS* solution integrates these terms in order to propose a suitable text analysis.
E.g.: *FMS, A/C, ATC, etc.*
 3. Metrics creation: thanks to *PLUS*, users can modelize semantic aspects to then find it easily in the database (even HF issues).
E.g.: *human fatigue, leadership issue, etc.*

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Functionalities

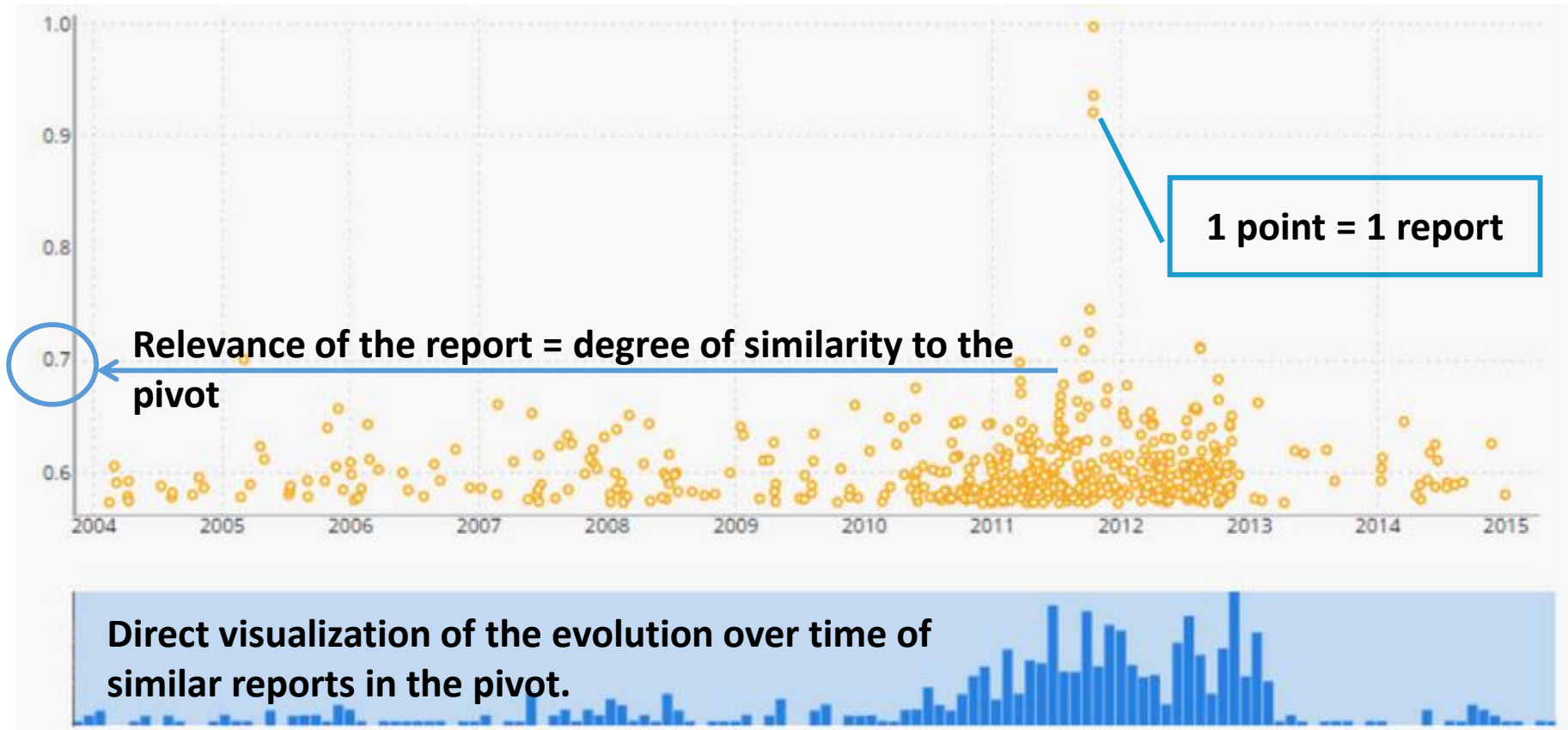


- **Smart Search** : Lexical variations, acronyms, etc. are taken into account
 - **Textual similarity analysis** : Put reports together thanks to their textual content
 - **Dimensions analysis** : Create a model to recognize a particular dimension in a text (human fatigue, stress, etc.) and organize the database thanks to this dimension.
 - **Categorization** : Learn and apply a classification from linguistic analysis of the textual data
- ➔ Information created from analyzed textual data (measures like similarity or dimension for example) to provide a better way to explore data.

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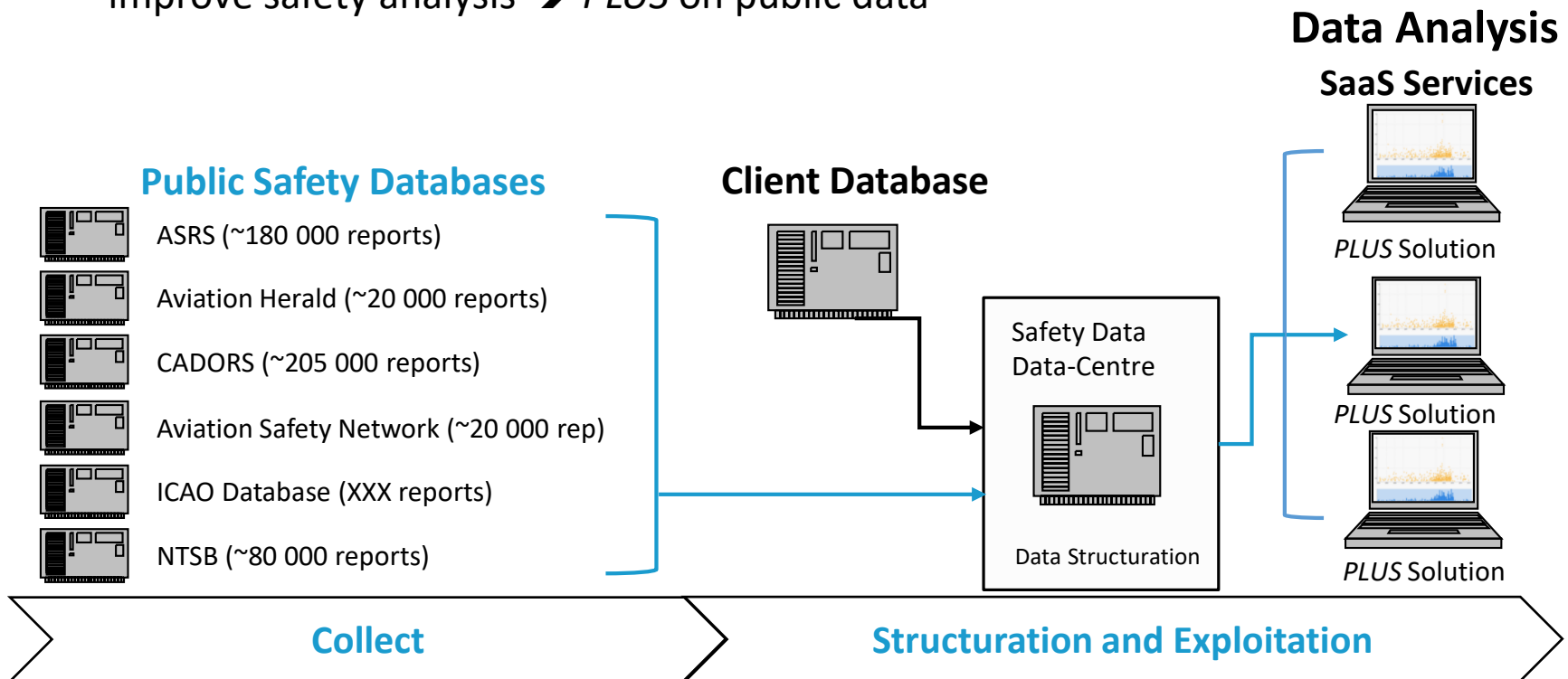
Textual similarity analysis: outputs ordered by relevance



Enhancing your internal data with external data



- We need to share data: every expert needs to have access to numerous and various situations to have a complete view of what happens with technical events and to improve safety analysis → *PLUS* on public data



They trust us...



International and National Authorities



AIRFRANCE

Airline

Aeronautic Manufacturers



Spatial Operator



Energy



Railway Operators



Medical Organization



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4 Pillars of the solution

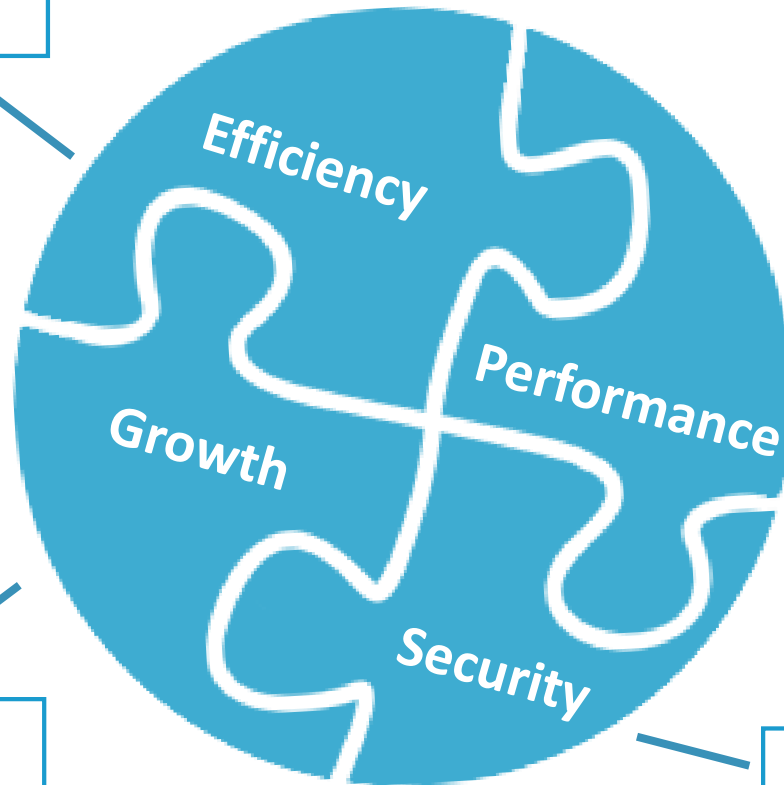


Improving service
delivered to business

High quality information
extracted in seconds

Technology designed to
support Big Data

Partnership with EBRC,
Iso27001 certified





Thank you for your attention

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