

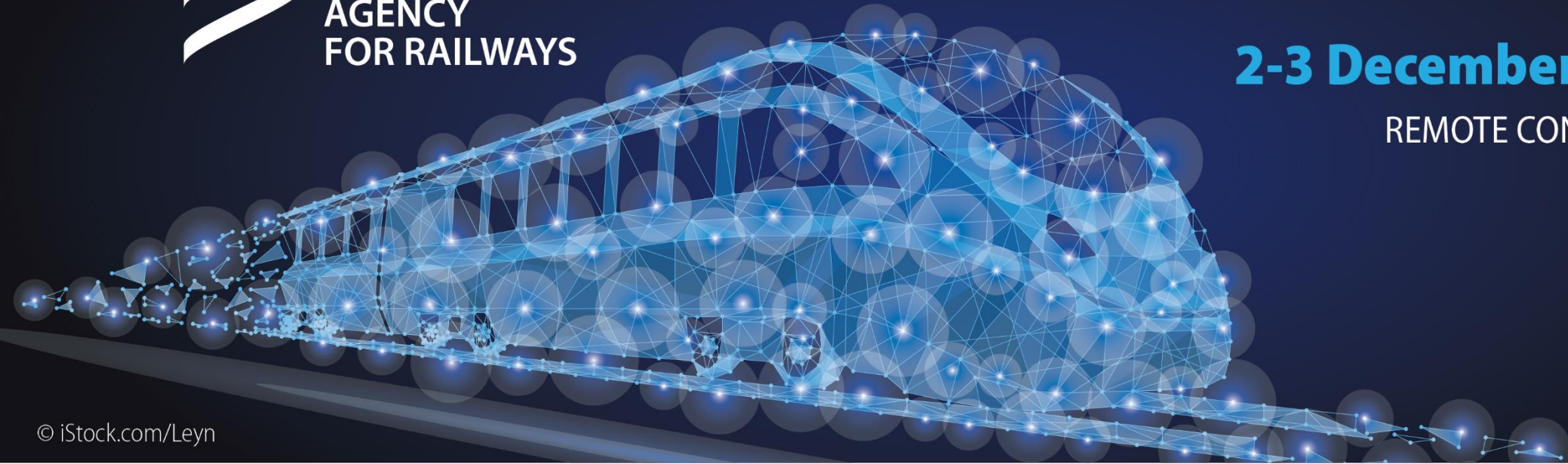


EUROPEAN  
UNION  
AGENCY  
FOR RAILWAYS

# Integration of Human and Organisational Factors in Railway Automation

**2-3 December 2020**

REMOTE CONFERENCE



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Digital transformation of the rail sector :  
what impact on HOF?

Laurent CEBULSKI  
EPSF, FRANCE

# DIGITAL TRANSFORMATION OF THE RAIL SECTOR :

## WHAT IMPACT ON HOF?

of Laurent CEBULSKI

EPSF, FRANCE





**Laurent CEBULSKI, Managing Director, EPSF, France**

**Doctor in mechanical engineering, Laurent CEBULSKI has been working in the railway sector for nearly 25 years. He was notably an expert, head of research and development, then director of authorizations within the French railway safety authority. He was appointed CEO in September 2020.**

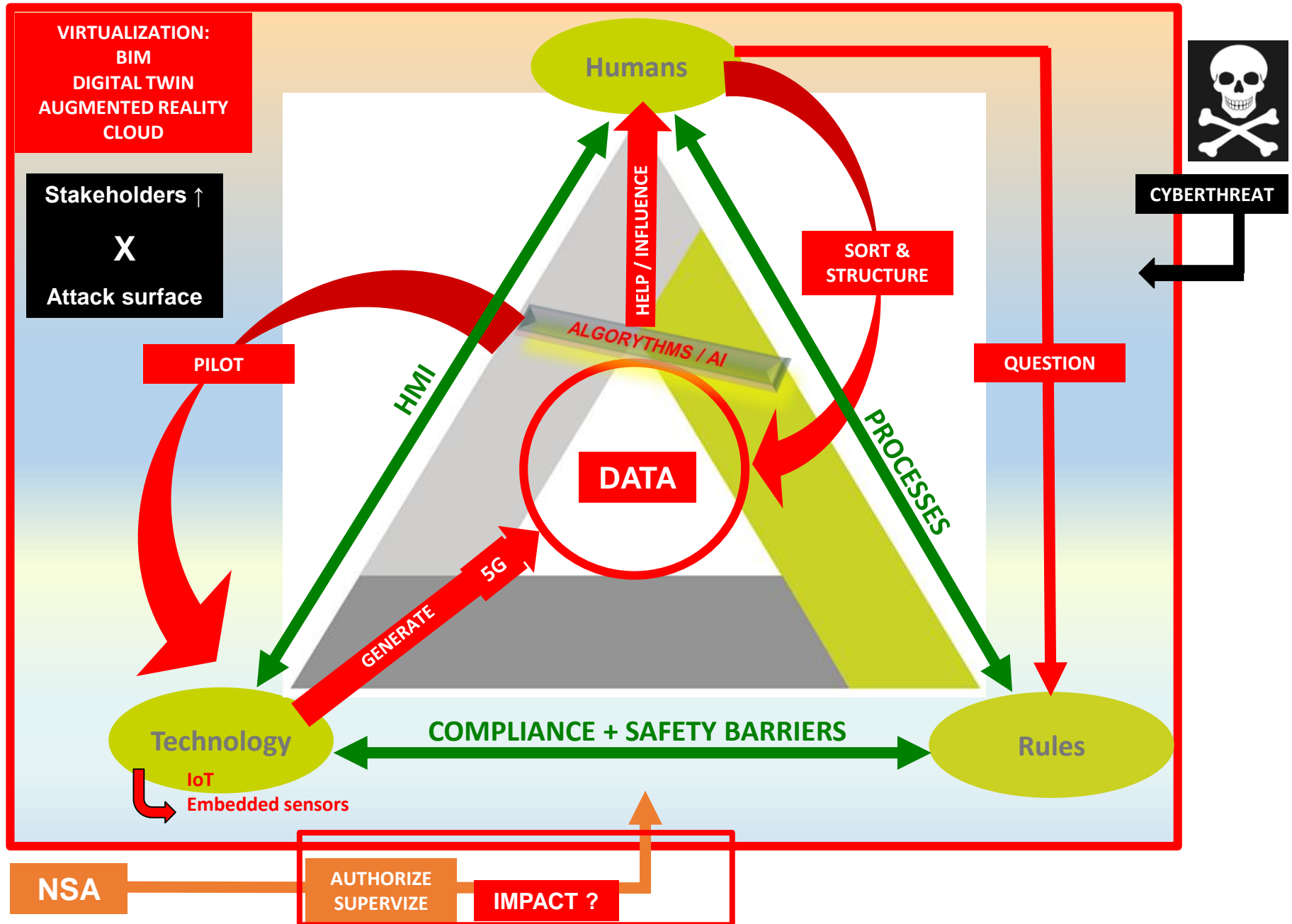


# HOW MAN AND MACHINE WILL LIVE TOGETHER TOMORROW ?



Integration of Human and Organisational Factors in Railway Automation

# A NEW PARADIGM





## NEW PRACTICES

### 1. USE OF NEW TECHNOLOGIES TO LIMIT OPERATION COSTS

→ *Autonomy* **AI** **DATA** **REGULATION** 

→ *Virtual certification* **REGULATION** **DATA**

→ *BIM* **DATA**

### 2. OPTIMIZE AVAILABILITY WHILE ENSURING SAFETY

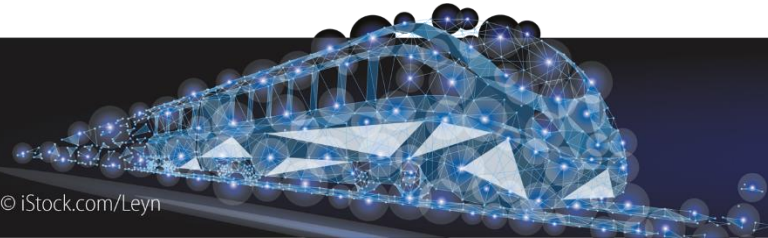
→ *IoT for predictive maintenance* **DATA** **AI** 

→ *Digital twin for diagnostic and railway operation* **AI**

### 3. QUICKLY DEPLOY STAFF CAPABLE OF PERFORMING SAFETY TASKS

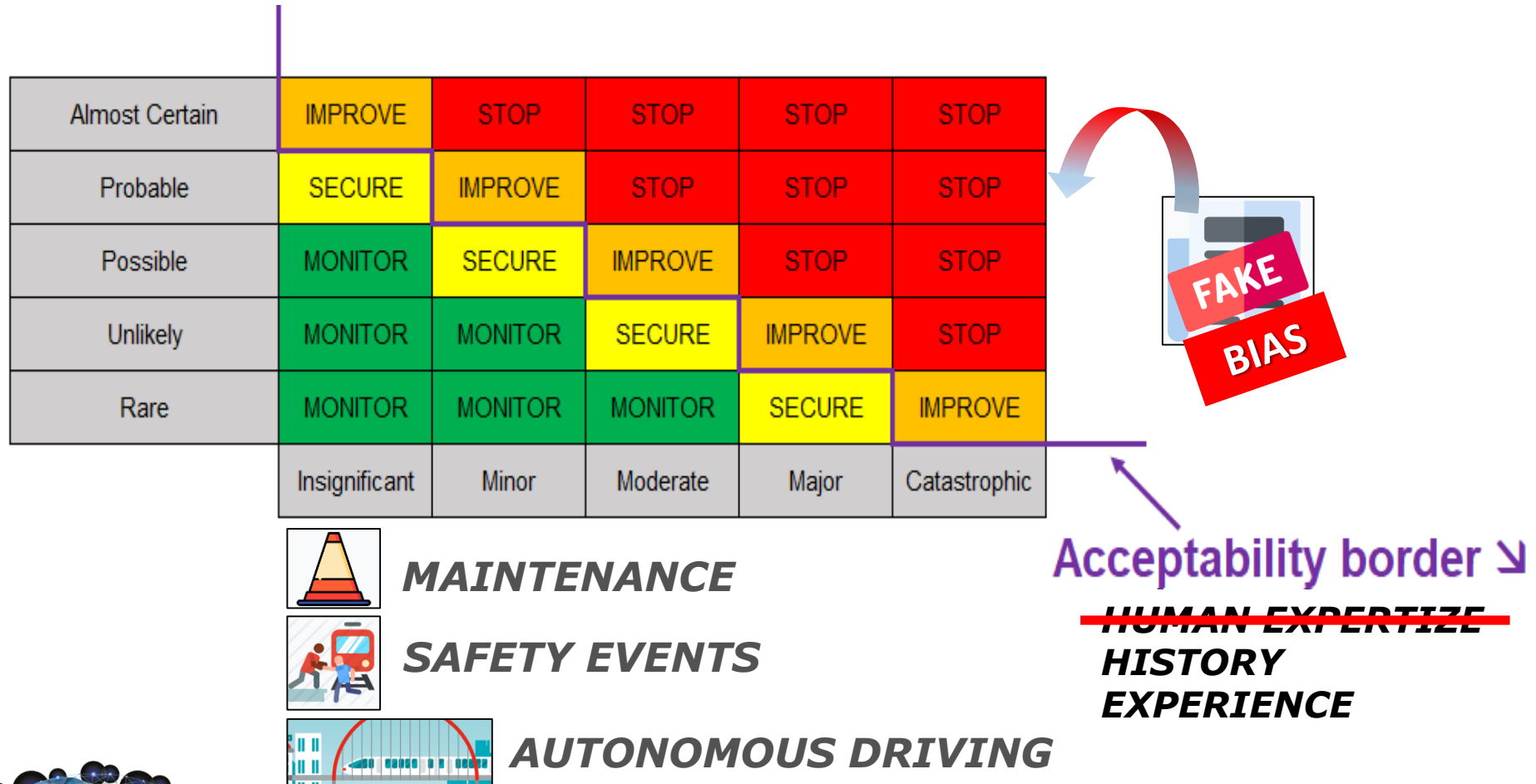
→ *Augmented reality for interventions* **REGULATION** **AI**

## Which railway system tomorrow?

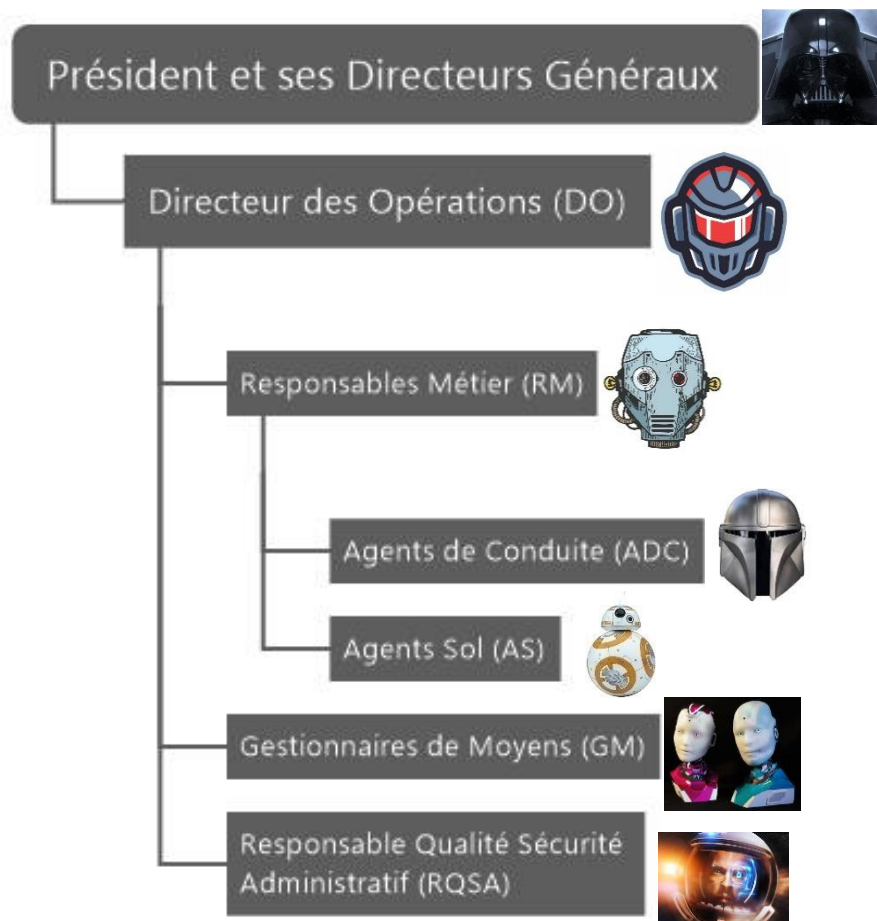


# TOMORROW'S BOUNDARIES ?

« Given the data I have and the power of my algorithms, safety is assured if this threshold is respected »



## WHAT IMPACT ON SMS ?



How to manage automated systems?

What impact on the organization of operators?

What impact on their SMS, the men and women in charge of it?

What about decision-making for safety issues ?

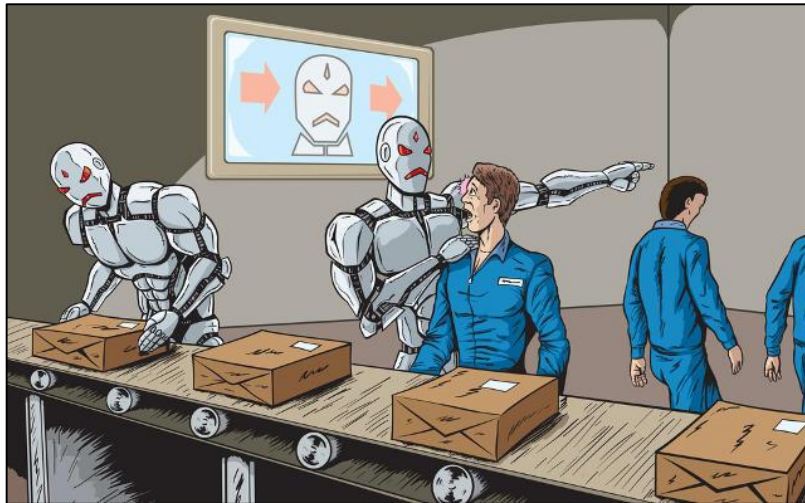
What security barriers at the decision-making levels?

How can predictive models influence or bias the decisions?

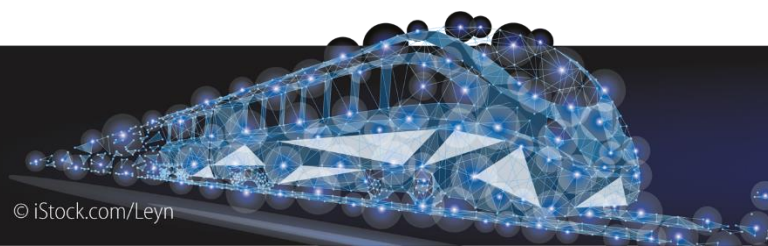
How far can we trust models?



- Let models become the absolute truth
- Lose control on algorithms – be unable to identify biases
- Try to “modelize” HOF
- Be convinced that [rules + models] = HOF Framework



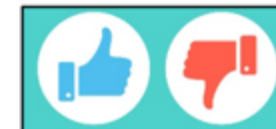
Let's keep our critical mind and our freedom of thinking!



## LET'S TAKE A STEP BACK

### *Will machines & models predict human behavior?*

- Current models are based on simple surveys (like/dislike x billions)



- Machines will never have a wide spectrum of nuances



User



Electronic  
engineer



Material  
engineer



Geek



Safety engineer



Artist

- Instinct is part of HOF



- Data accumulation doesn't build a safety culture



SO

## Automation should be used :

- *Organization* : as a power calculator but not as a final decision maker
- *Technological systems* : as a very reliable layer mastered by human brain
- A nudge policy could be developed



## Human critical mind remains the best machine we will ever have. Anyway:

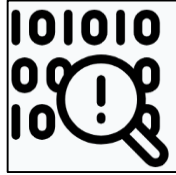
### The mindset of millennials should also be taken into account:

- Limited attachment to the company
- Limited allegiance to authority
- High intellectual competencies: +8% - Technological competencies: + 55%  
- Emotional criteria: + 24%

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## NSA'S MISSIONS ARE GOING TO EVOLVE



- Check algorithms?



- Challenge massive data analysis?



- No standard or regulation?



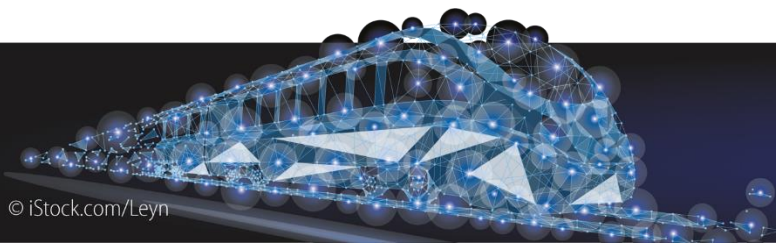
- Responsibility?



- Railway safety vs cybersecurity?

**NSA's have to perform their own digital transformation**

- *To assess day after day the impact of the induced complexity of automation on businesses and practices*
- *To build clear and harmonized positions on AI, automation, railway cybersecurity to avoid interoperability brakes*
- *To start transforming jobs and developing new skills*
- *To anticipate future regulations without waiting to be up against the wall!*



## CONCLUSION

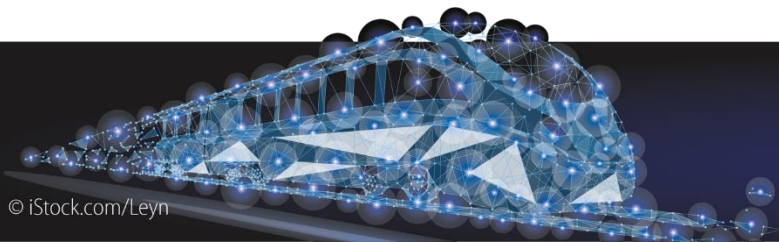
- Railway world is being digitized
- Anyway, human remains the heart of the system
- Models & algorithms should be used very carefully
- Impact of automation is universal:

**HOF, ethics, even philosophic.**



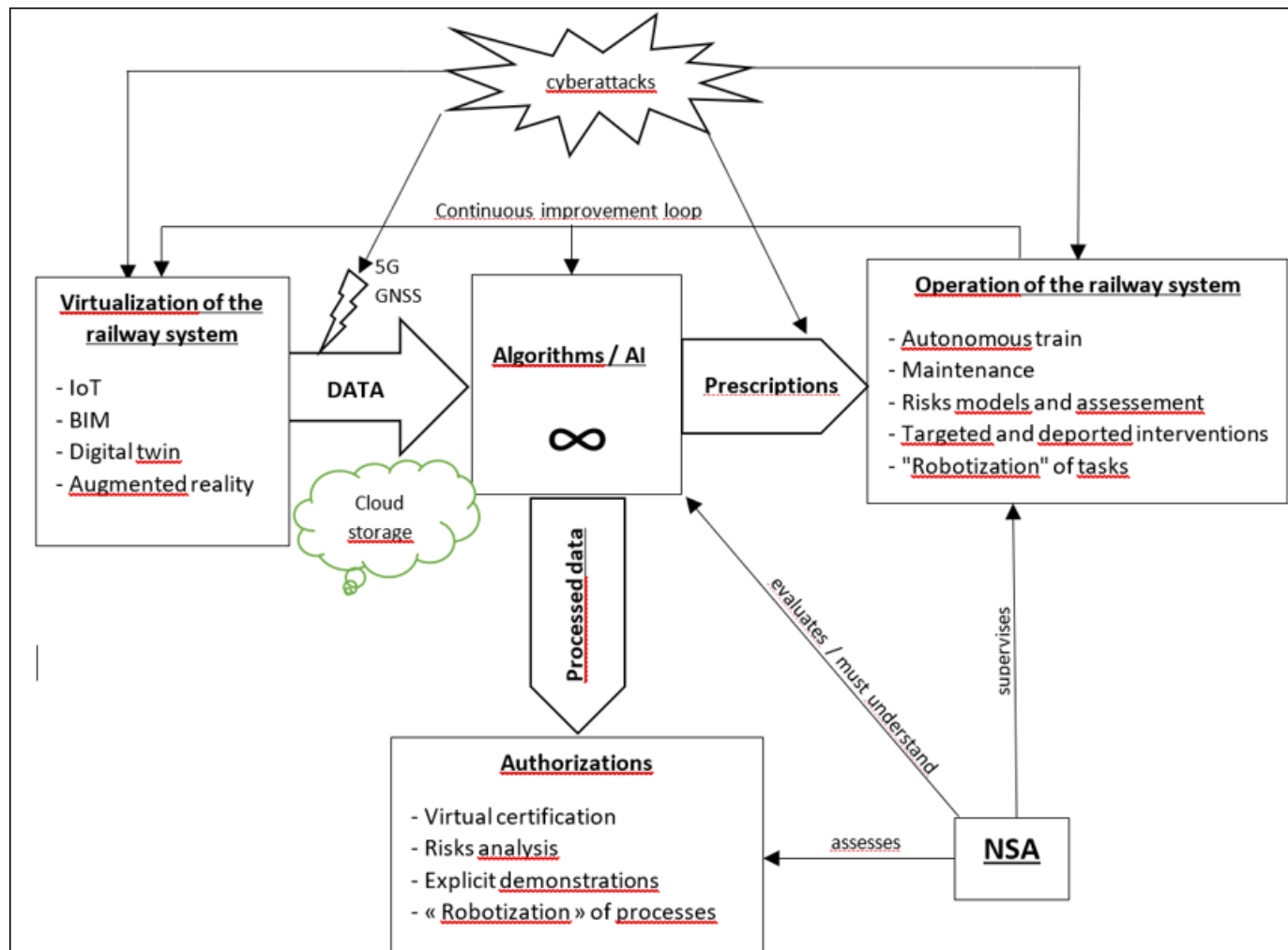
*Human beings will always believe that the more human the robot appears, the more advanced, complex and intelligent it is.*

*[\(Isaac Asimov\)](#)*





THANK YOU FOR YOUR ATTENTION



# Q & A

In the next 20 minutes Mr. CEBULSKI will reply live to your questions.

- You may wish to write your question in the Teams Live chat, or
- Receive a detailed reply after this conference: use the link provided on the event webpage.

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