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APPLYING STAMP TO IMPROVE THE EVALUATION OF SMS

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2nd European STAMP Workshop
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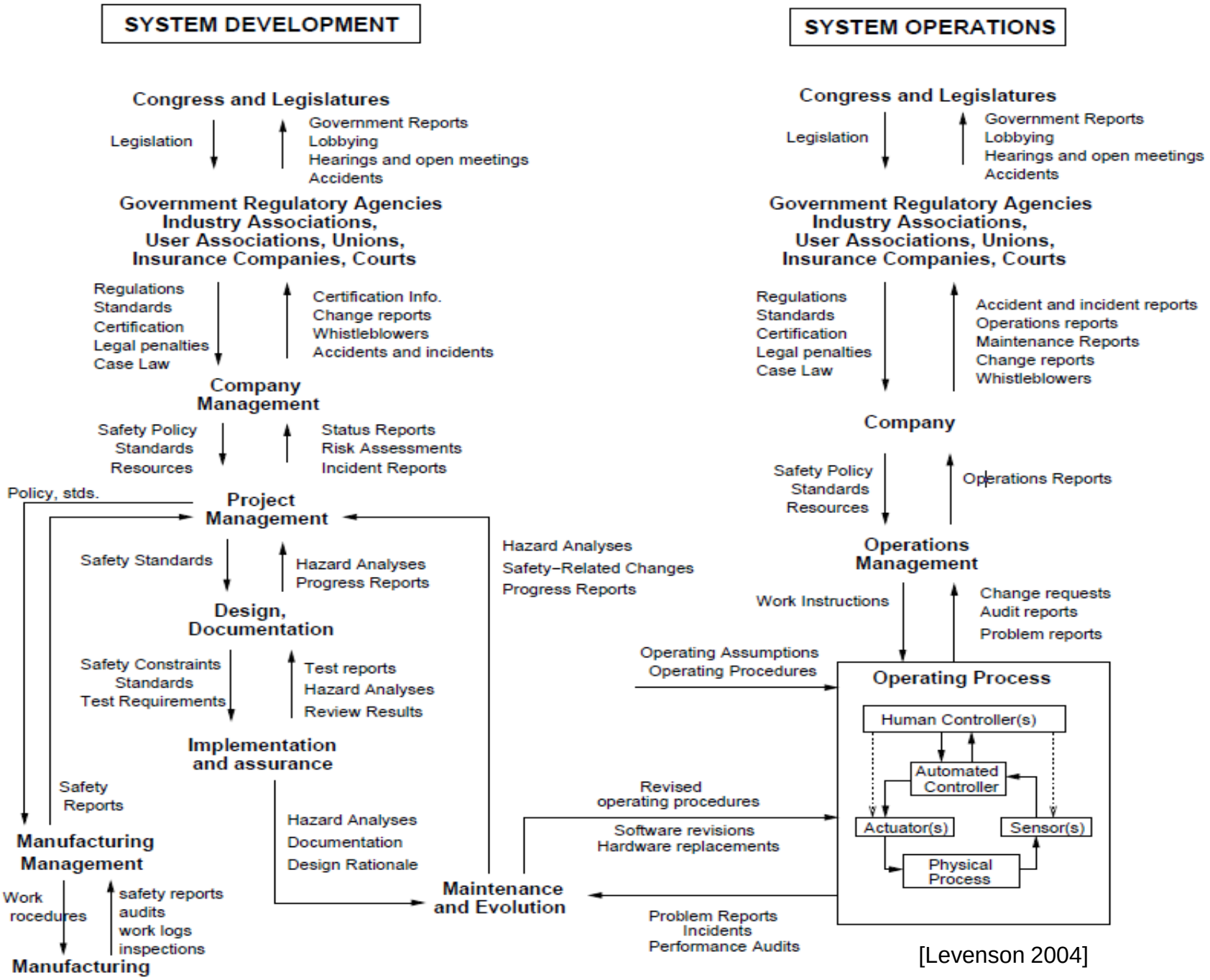
CREATING TOMORROW



[Levenson 2004]

CONTENTS

- Background
- Purpose
- Approach
- Results
- Conclusions

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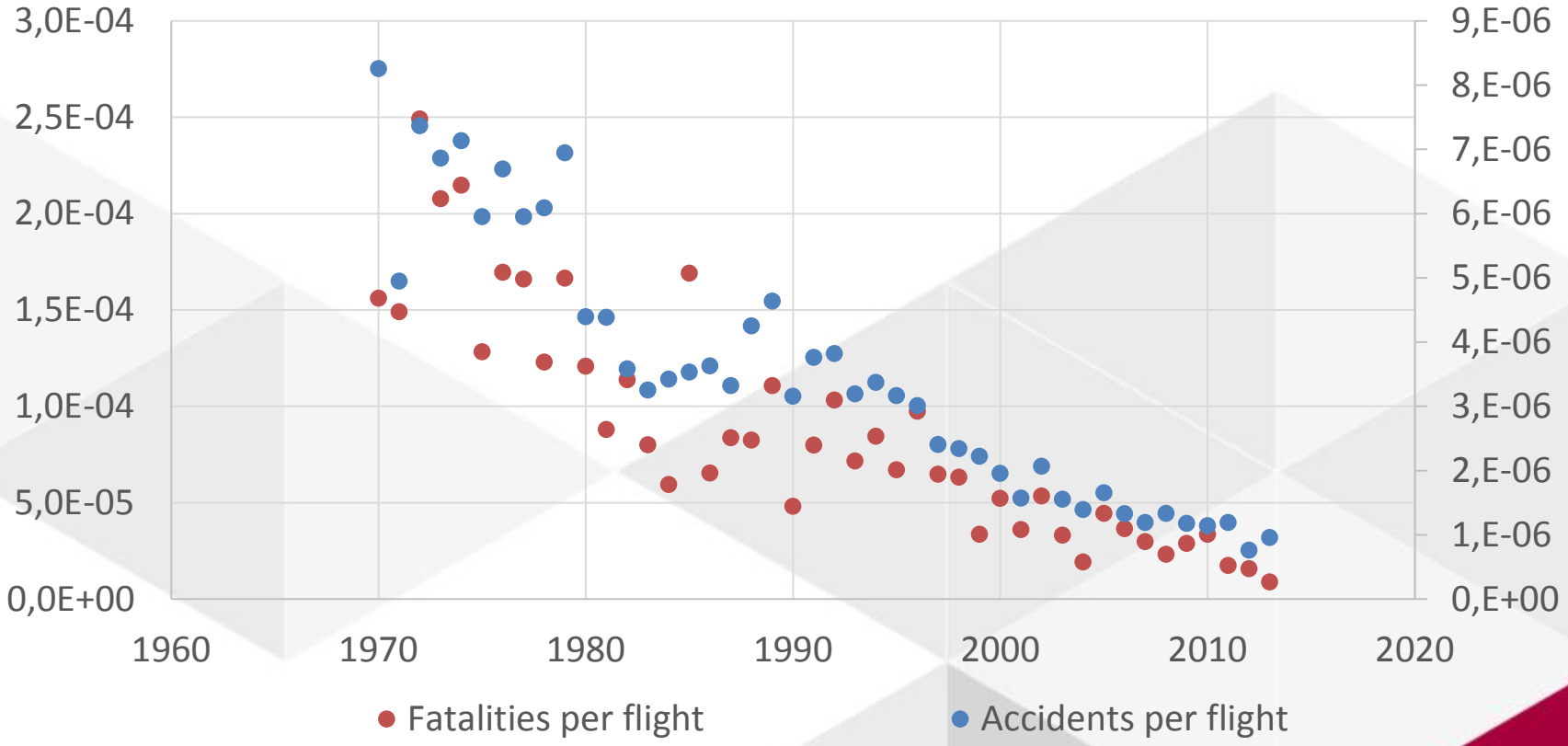
BACKGROUND

AVIATION SAFETY HAS REACHED AN ALL-TIME LOW IN 2013



FSF Aviation Safety Network, 2014

CHANGING OVERSIGHT: FROM COMPLIANCY-BASED TO A RISK-BASED

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PURPOSE

www.international.hva.nl

PURPOSE

- To identify the value of applying STAMP to the European aviation regulatory system
  - Identify risks that have not previously been identified for the change from a compliancy-based to a performance-based oversight
  - Assess value of methodology
- The scope of the current study is limited to aviation maintenance
  - maintenance companies are relatively small
  - vulnerable for complex and inefficient regulatory systems
  - Besides, the decreasing number of in-flight safety issues forces the industry to pay more attention to on-ground hazards

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APPROACH

www.international.hva.nl

APPROACH

- The current study has applied a modified five-step STPA methodology:
  - Identify hazards and safety requirements
  - Define functional control structure
  - Identify control actions
  - Allocate safety requirements to components
  - Determine control loop effectiveness.
- Results compared to previously identified EASA risks

Leveson 2011, 2014

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RESULTS

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INITIAL FORMULATION OF HAZARDS

- Competent staff shall carry out and sign off maintenance.
- Maintenance shall be carried out according to the latest legislation and job cards.
- Safety shall be ensured by defining organisation-wide processes that provide for effective risk-based decision making.
- The industry shall continuously improve safety by learning from occurrences or incidents at any level.

REDEFINED HAZARDS WITH EASA

- Regulations are not prescribed resulting in unsafe operations of maintenance organisations
- Maintenance organisations do not comply with prescribed regulations resulting in unsafe operations of maintenance organisations;
- Risks, other than the risks mitigated by prescribing regulations, are not identified and thus not mitigated resulting in unsafe operations of maintenance organisations
- Feedback on the functioning of the regulatory system is not provided resulting in a not completely effective regulatory system in terms of preventing the three aforementioned hazards from happening

SYSTEM SAFETY REQUIREMENTS FOLLOW FROM THE HAZARDS

1. (Risk) control in the form of regulations shall be in place at any level.
2. A system which properly oversees and enforces regulations shall be in place.
3. Industry and organisations shall identify and mitigate risks.
4. Feedback on the functioning of the system shall be provided.

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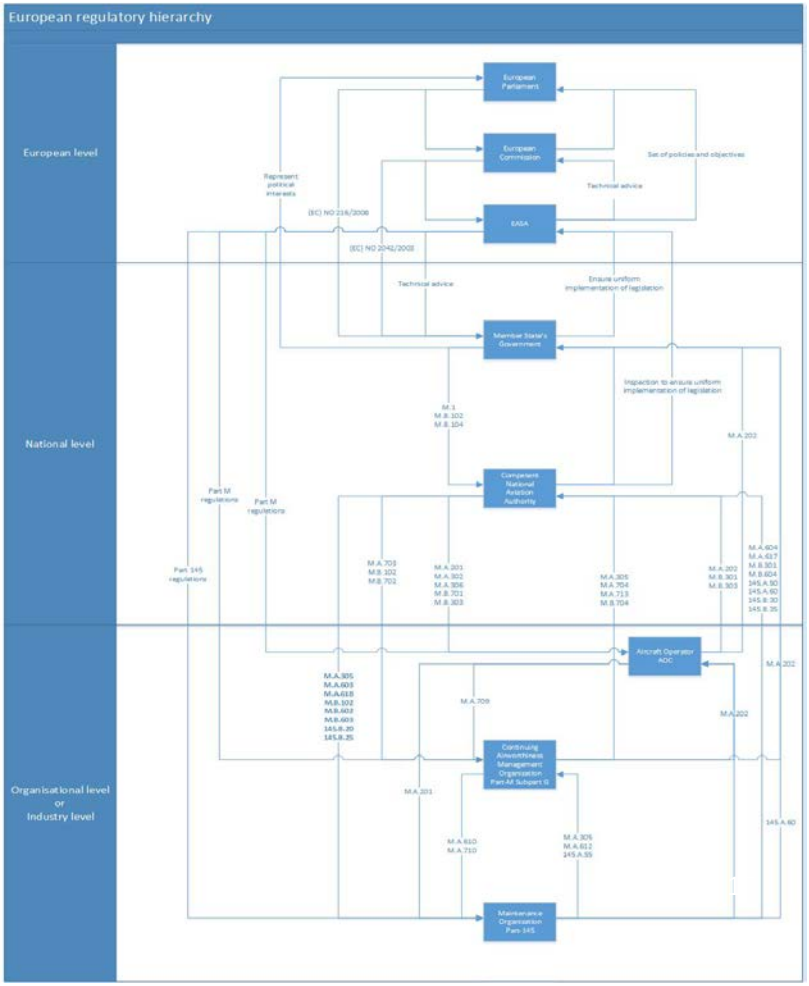
FUNCTIONAL CONTROL STRUCTURE

simple

Detailed (illegible)



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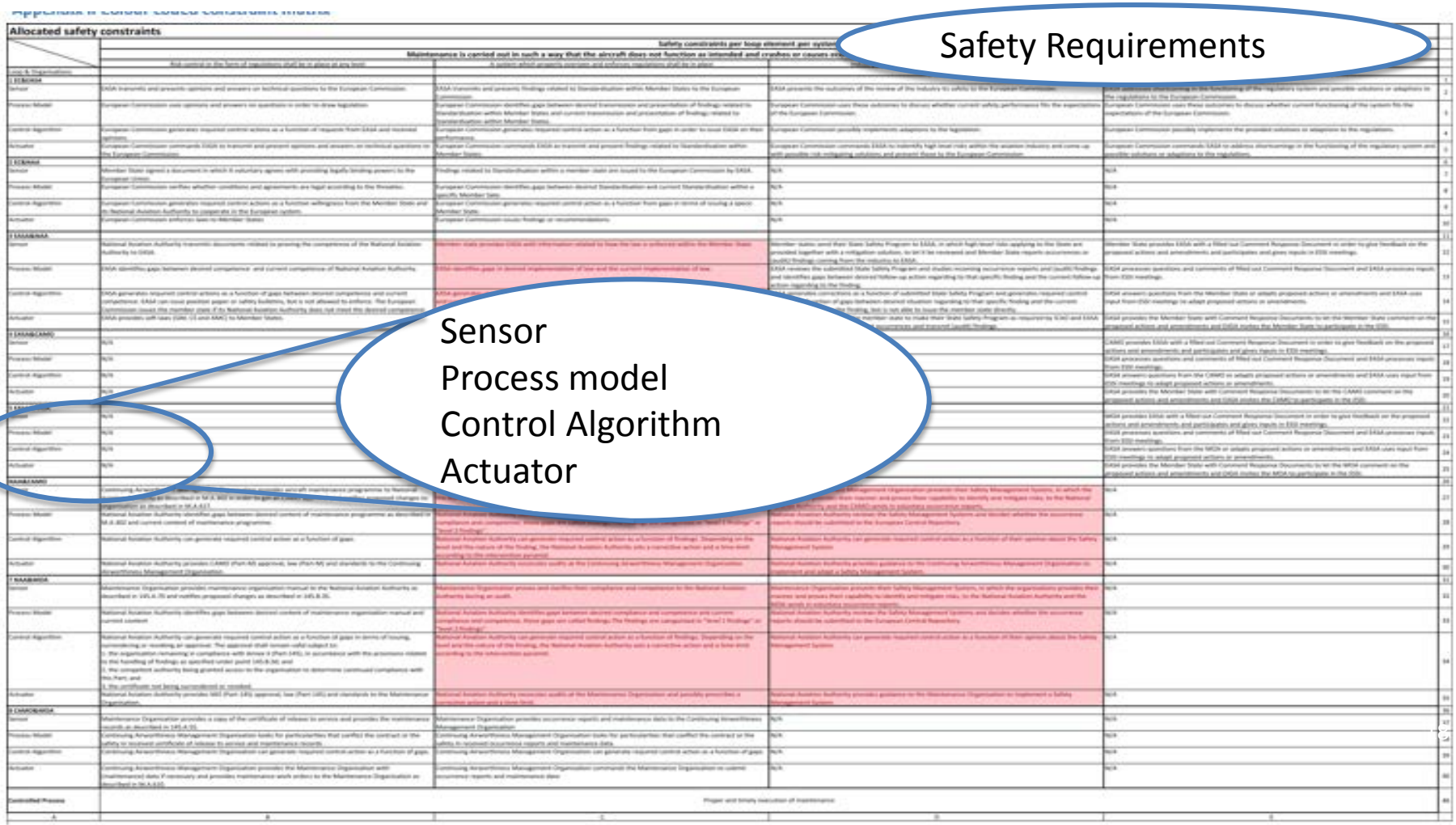
SAFETY RQUIREMENTS VERSUS CONTROL STRUCTURE & IDENTIFICATION OF FLAWS



CONTROL FLAWS ACTION 1: COMPLY WITH THE REGULATIONS

- EASA has no appropriate powers to perform enforcement actions

CONTROL FLAWS ACTION 2: CHECK COMPLIANCE OF ORGANISATIONS

- Poor financial situation of Member States may result in underperforming oversight

CONTROL FLAWS ACTION 2: CHECK COMPLIANCE OF ORGANISATIONS

- Ongoing discussion about the acceptable level of risk

CONTROL FLAWS ACTION 3: PERFORM RISK-ANALYSIS

- There is no proper risk-management capability assessment tool

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CONCLUSION

CONCLUSION

- STPA highlighted four weaknesses in the European aviation regulatory system
  - EASA has no appropriate powers to perform enforcement actions
  - Authorities could give organisations too early and too much freedom in managing their own risks
  - There is no proper risk-management capability assessment tool
  - Ongoing discussion about the acceptable level of risk and an acceptable level of safety
- Issues are not completely new
  - STAMP identified these in a systematic manner
  - Executed by a novice researcher
- Methodology appropriate
  - Identify hazards and safety requirements
  - Define functional control structure
  - Identify control actions
  - Allocate safety requirements to components
  - Determine control loop effectiveness

FURTHER WORK

- Develop a risk-management capability assessment tool
  - Hopefully using STAMP
  - Dutch grant submission in December 2014
  - Tentative participants include Dutch OVV, EASA, CAA-NL, KLM, Dutch ATC, many smaller companies
  - Participants meeting October 23rd, Amsterdam
- Develop an agent-based model of safety supervision
  - In partnership with TU Delft and Free University Amsterdam

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