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Aviation in Europe – Innovating for Growth

The 7th European Aeronautics Days



L O N D O N



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Proactive Safety Performance for Operations

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Contents

- Context
- PROSPERO project
- PROSPERO concept
- PROSPERO future



PROSPERO Context – Ultra-safe Systems

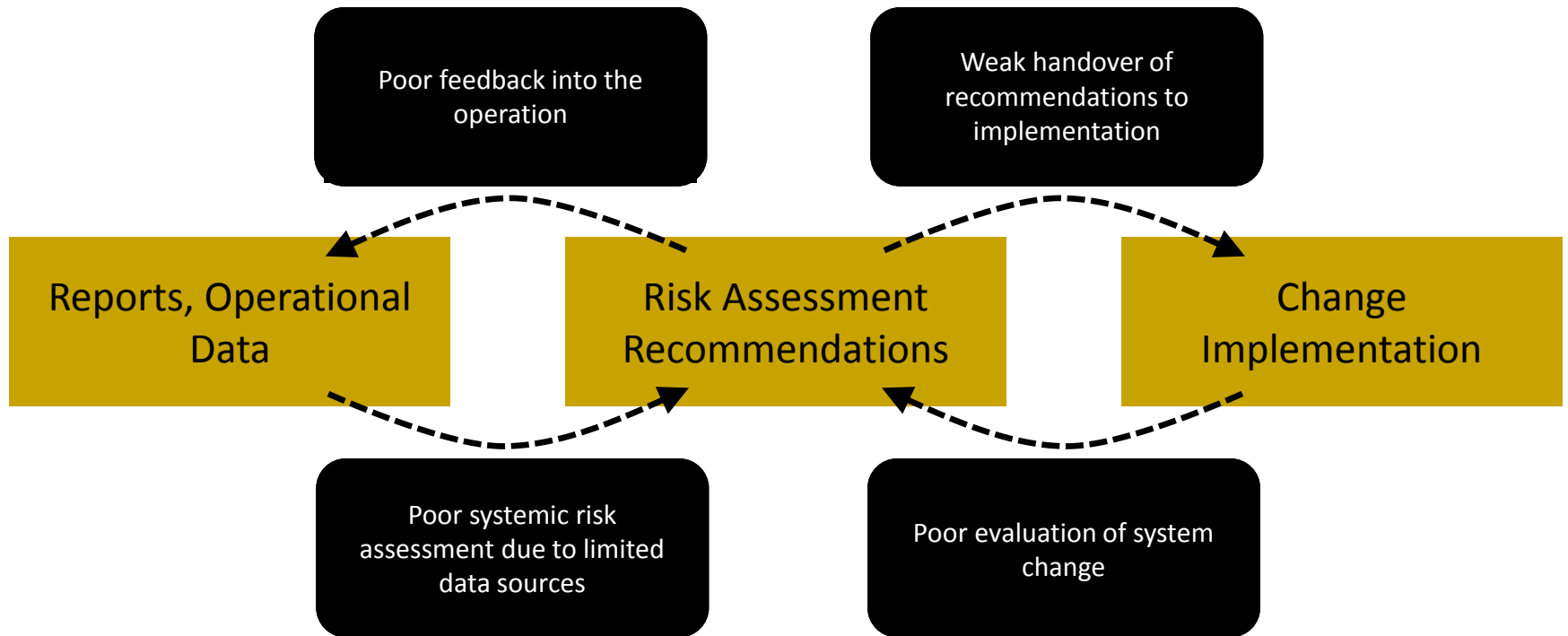
Up to 10^{-3}	10^{-3} to up to 10^{-5}	Up to 10^{-6} or better
The next accident will repeat the previous accidents	The next accident is a recombination of part of already existing accidents or incidents, in particular using the same precursors	The next accident has never been seen before. Its decomposition may invoke a series of already seen micro incidents, although most have been deemed inconsequential for safety

From Safe to Ultra-safe Systems (Risk < 10^{-6}) (after Amalberti, 2006)

- **Need to understand the sources of variance in normal operations (Safety 2)**
 - Integration of diverse sources of data, not separate silos
 - Not just incident/event data; not just Flight Data
 - Use this to manage risk proactively, preventively, systemically
- **Reduce the risk of emergent factors in change**



As-Is Process – Current limitations



There are 3 critical challenges to current safety management:

- To move beyond analysing what has gone wrong to analysing the normal operation in order to better anticipate potential failure
- To be able to implement change and improvement effectively and reliably
- To achieve a system view of the safety of the whole air transport system



PROSPERO PROJECT



Project partners and Advisory Board

Project Coordinator:

- Trinity College Dublin Ireland
- Aeroporti di Roma Italy
- Alitalia Italy
- Athens International Airport Greece
- Jeppesen GmbH Germany
- Societa Abruzzese Gestione Aeroporti, S.p.A Italy
- Swedavia Sweden
- Thales Avionics SAS France
- Carr Communications Ltd. Ireland
- Corballis Consulting Ltd. Ireland
- Deep Blue SRL Italy
- Innaxis Research Institute & Foundation Spain
- Kite Solutions SRL Italy
- KTH Royal Institute of Technology Sweden
- Reducing Risk Exposure Norway
- Technical University of Crete Greece

The **Advisory Board** includes members from:

EASA, Eurocontrol, SES Performance Review Board, ENAV, SAS, Avincis



PROSPERO CONCEPT



Concept

- PROSPERO delivers a new concept of safety management using risk knowledge derived from large and diverse sources of operational data
- PROSPERO supports the management of change, through in-depth analysis, collaboration, and monitoring progress



Acquisition

Feedback from performance



Integration

Comprehensive data



Feed forward
Relevant risks

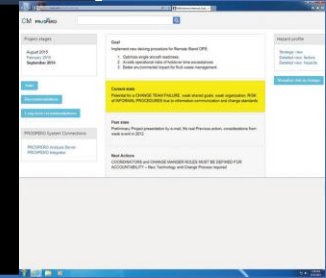


The PROSPERO Knowledge Cycle

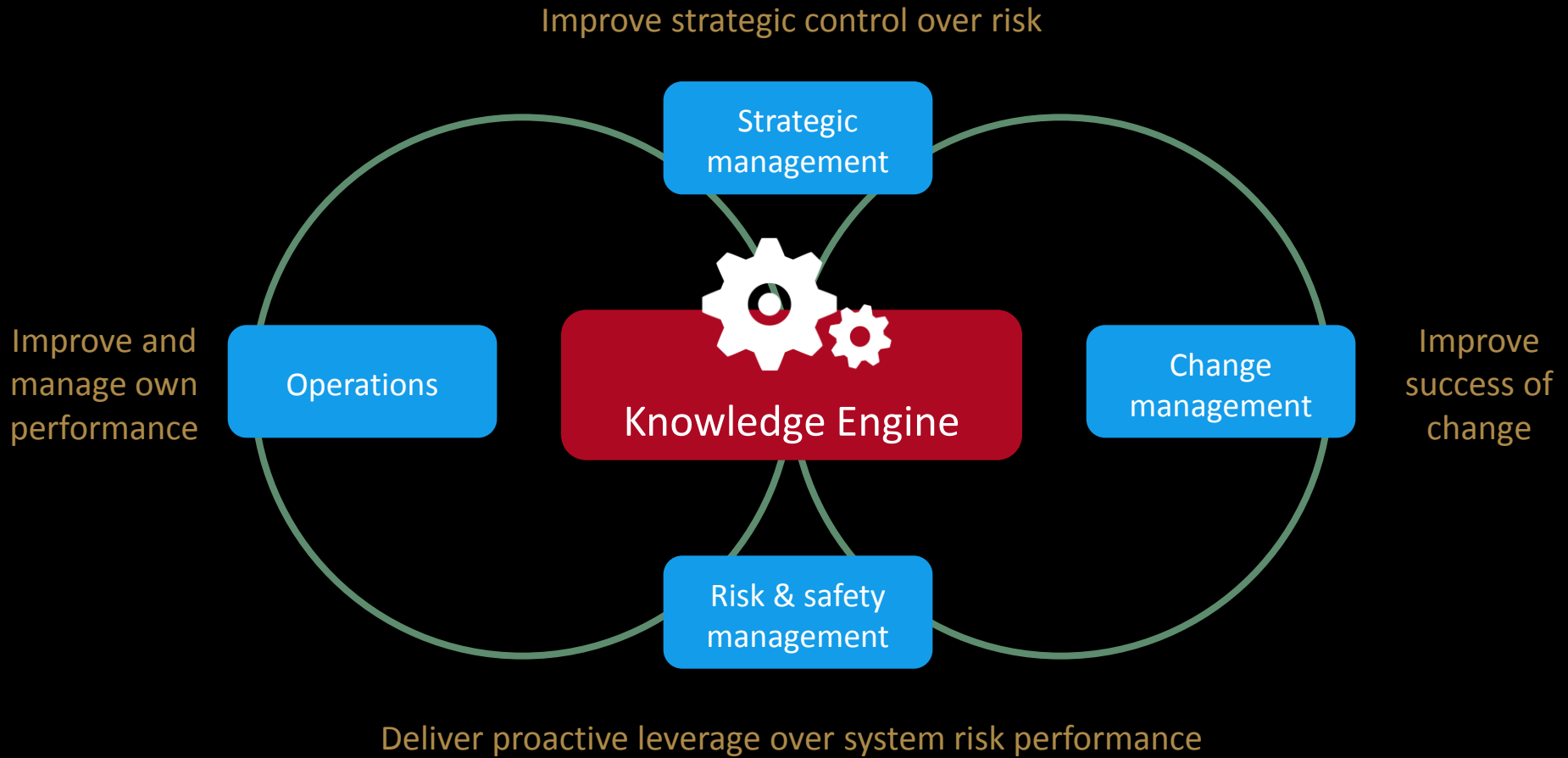
Pattern matching
Future risk



Analysis
Current status



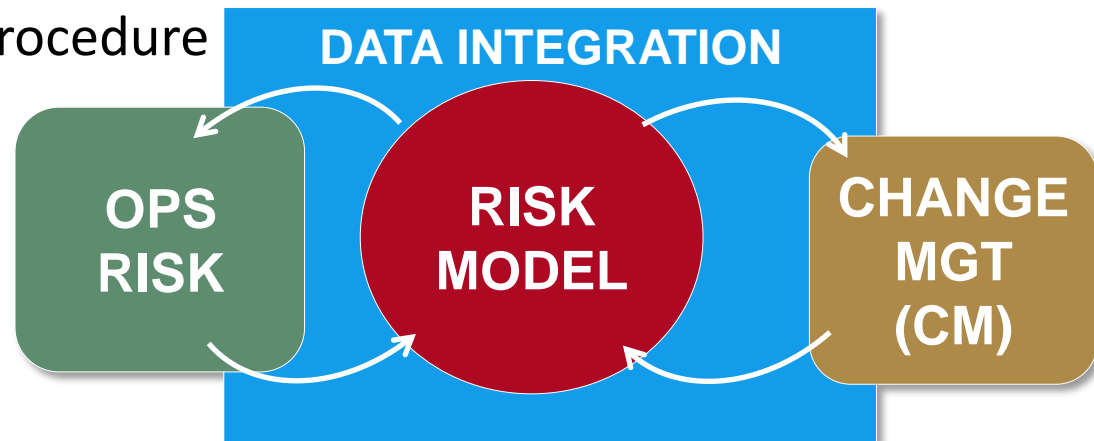
Creates value for stakeholders



PROSPERO System Demonstrator

Three complementary case studies demonstrate the core system principles:

- **Systemic data analysis and feed-forward into operations**
 - Predicting Birdstrikes integrating airline and airport data
- **Extending the analysis to ATM**
 - Sector complexity
- **Managing the risk in change**
 - New de-icing procedure



PROSPERO IN THE FUTURE



2020 safety performance regulation for Single European Sky

- But.... safety performance depends on all actors in the ATS – not just Air Traffic Management
- The risks are shared - between airlines, airports and air traffic management
- The Key questions are:
 - How is it possible to achieve integrated management of safety?
 - Can competitive companies share information?



The PROSPERO Network enables collaboration around shared interests

- Partners share information in return for valuable knowledge
- Competing companies share selected information with third parties with whom they share services
- Commercial confidentiality can be assured while ensuring that system risks are identified and managed





Maintenance

Airlines have a network of service providers including ground operations and maintenance.



Airline



Airline



Airline



Ground Ops



Ground Ops

Airports collaborate on shared risks with multiple airlines.



Airport



Airport

ATM - a complexity metric reconciles the risk of each flight with the aggregated risk in the configuration of the ATM sector.



ATM

Safety as a knowledge business

- Harvest & transform data into the right knowledge
- Delivered at the right place & right time to prevent, manage and mitigate risk
- PROSPERO transforms the competence of organisations to understand & control their own risks



Knowledge Creation

The value of knowledge:

New, tailored, up-to-date.

Based on systemic analysis.

Provides critical information for performing this task now.

Data Services

PROSPERO closes the loop.

Integrates data within & between organisations,
- builds powerful models of risk.

Extends the analysis of SPI data to antecedents
- identifies how to solve the problem.

Supports implementation
- monitors effectiveness of solutions.

Knowledge Services

TCD Masters in Managing Risk and System Change provides capability to fully implement PROSPERO.

Best practice for managing risk and change.

Students from diverse domains –
aviation, emergency, health, financial services.

Simple, Necessary

- Achieving this is relatively simple from a technical point of view, but it requires making the right conditions of trust and confidence
- All organisations must improve their capacity to manage their own risks – including shared risks



Inevitable

- This is inevitable – as new technologies are enabling new approaches to management – it is really important that safety is not left behind
- Our partner companies are doing this now
- Join the journey



Thank you!

- <http://www.prosperofp7.eu/>
- **Online M.Sc. Managing Risk and System Change:**
<https://psychology.tcd.ie/postgraduate/msc-riskandchange/>
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