Key Issues on Sharing and Transformation of Lessons from Experiences by Actor Organisations in the Aviation Industry

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PSAM9 Hong Kong – July 18-22, 2008

HILAS

TU Delft
Delft University of Technology

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Overview

- Introduction to HILAS
- Learning from Experience by Organisations in Aviation
- Key Issues
- Conclusion


What makes the aircraft fly?
crew member = ENGINE !

HILAS Project [FP6]

The overall objective of the HILAS system is to

continuously improve

the safety and operations

of airlines, maintenance repair organisations (MROs) and original equipment manufacturers (OEMs)

Urgency:

- increase of transportation needs
- relative decrease of persons who want to become a pilot
- regarding aviation, public opinion is sensitive to single events

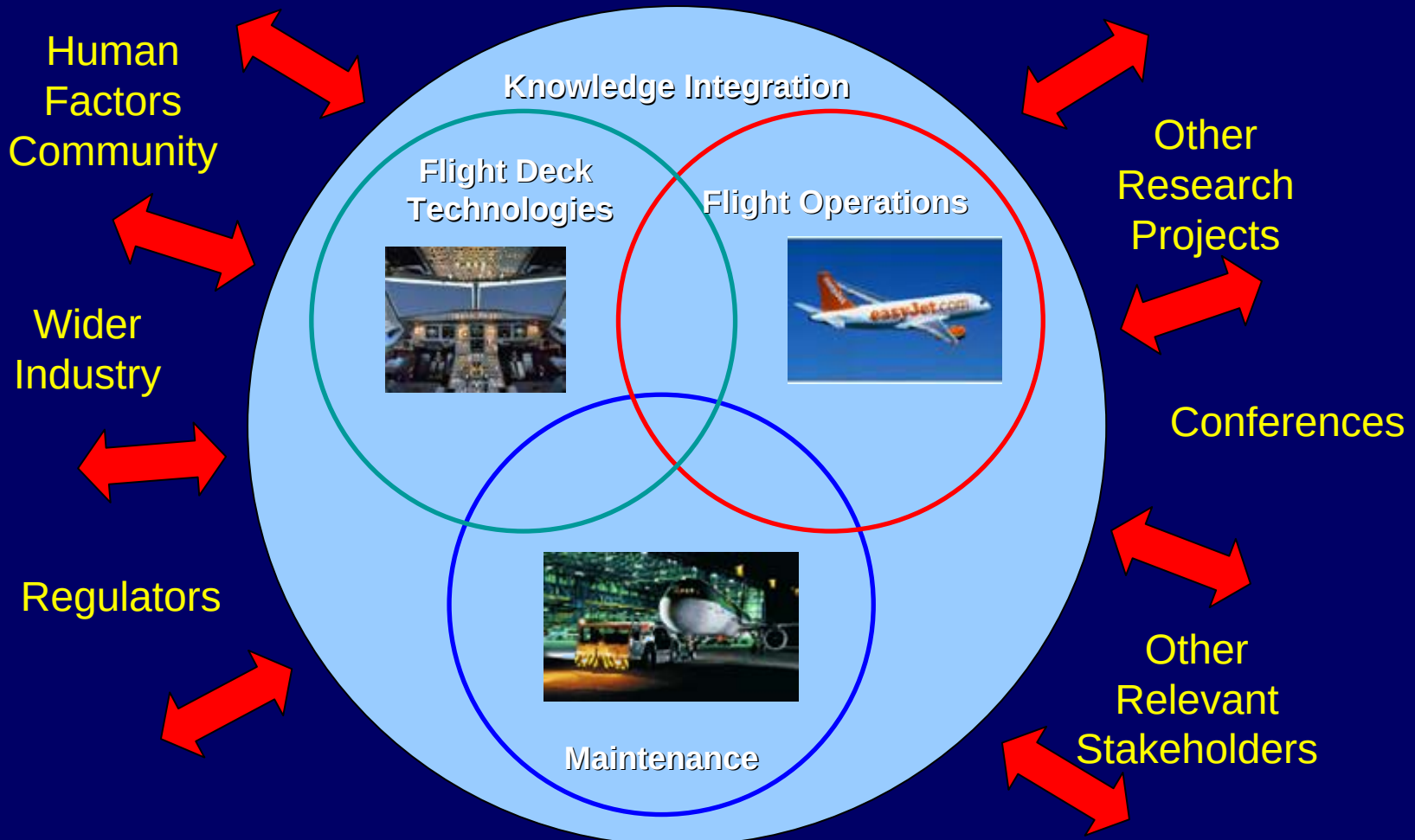
HILAS Partnership

- 39 organisations from Europe, Israel and China
- Life-cycle / supply chain representation

  25 industrial partners
- Airline operators
- Maintenance organisations
- Aerospace manufacturers and suppliers

  14 institutes, etc.
- Research institutes and universities
- Human Factors and IT consultancies

HILAS Project Structure



Underlying Approach

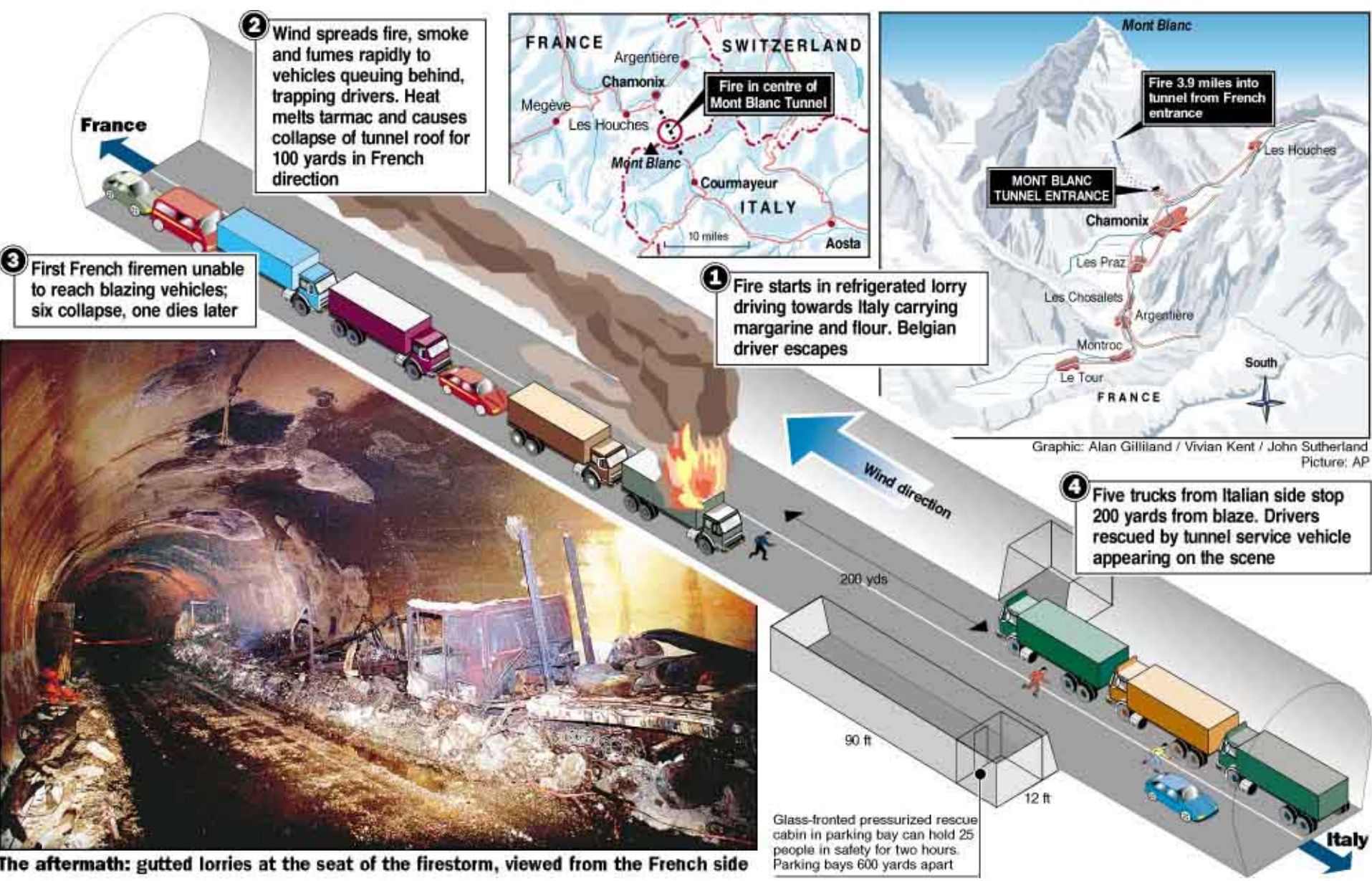
- **elicit** operational performance data
- **store** data in data memory
- **process** data
- store results
- do something smart with data
- ...based on use context and user requirements
- store results also
- identify basis for **sharing** HF knowledge, data, i.c. lessons learned
- develop system to **support use** of meta data and sharing
- **support** company's tactical ad strategic **risk decision** making

Process of Learning from Experience

- Incoming data from different sources [streaming flight data, reports, LOSA, ECCAIRS, outside world, etc.]
- risk radar function
- data processing to identify problems or need for inquiry
- inquiry for problem analysis
- decision making - tactical, strategic
- @ relevant levels, criteria depending on...

to be completed by adjustment of operations by

- learning lessons = implementing them [as Apostolakis cited: there is no difference between word and action; biblically: word = deed] + store lessons in accessible memory for reuse



Graphic: Alan Gilliland / Vivian Kent / John Sutherland
Picture: AP

The aftermath: gutted lorries at the seat of the firestorm, viewed from the French side

Data Collection Pitfall: **loss-of-context** ⇔ **context handling**

Some challenges

- aviation system = multi-actor social system...
- data is espoused/explicit/cognitive, THUS an incomplete representation of 'reality' of social systems
- learning requires some insight in *what* there is to learn...
- for problem understanding, *tacit knowledge* of operational people is invaluable to appreciate the daily contexts
- organisations have limited resources to learn, requiring Organisational Memory accessible for reuse of previous lessons learned
- assessment criteria that CEO level managers apply for decision making differ in nature from those used for assessment of safety risks

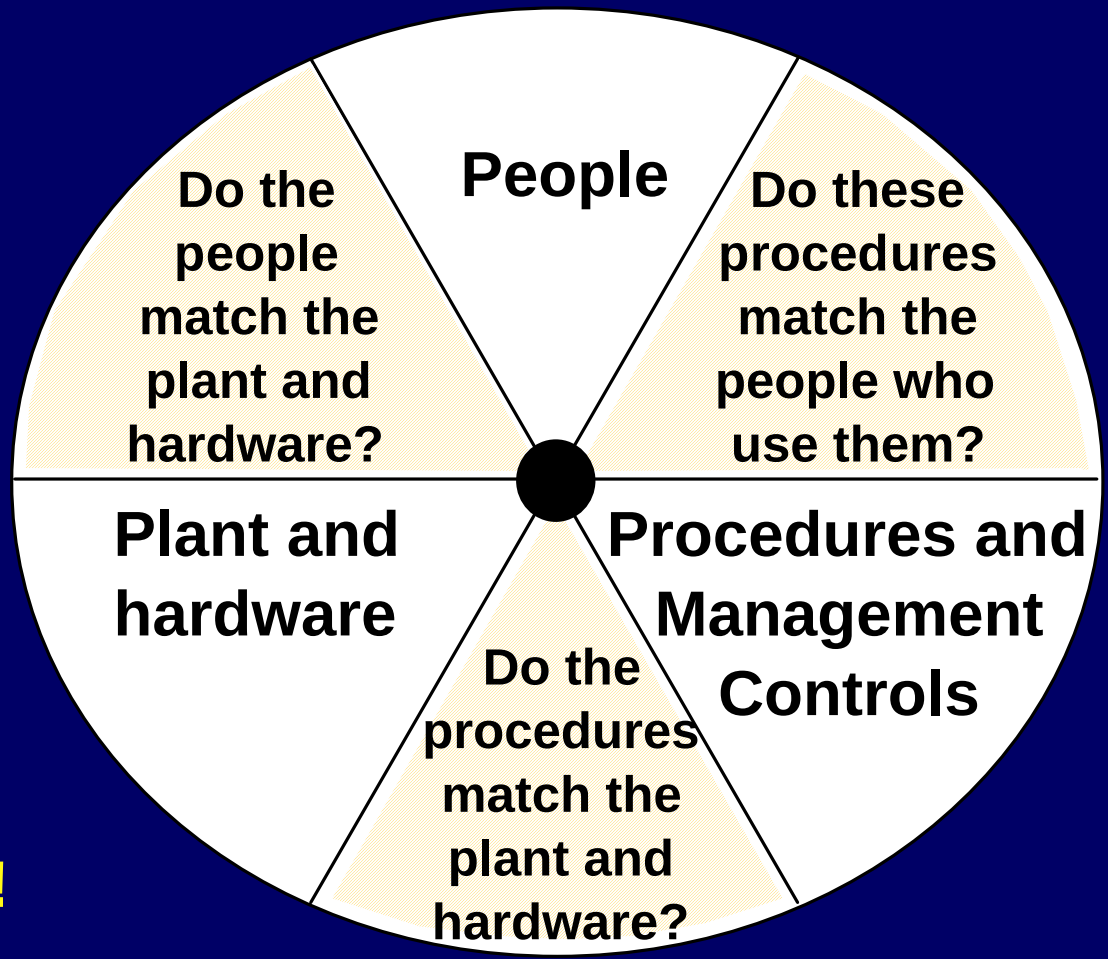
Operational Readiness - PPP

Nertney's Wheel (simplified)

or

what is there to learn?

This is about operations
= raison d'être of an organisation



Currently:
not clear in industry!

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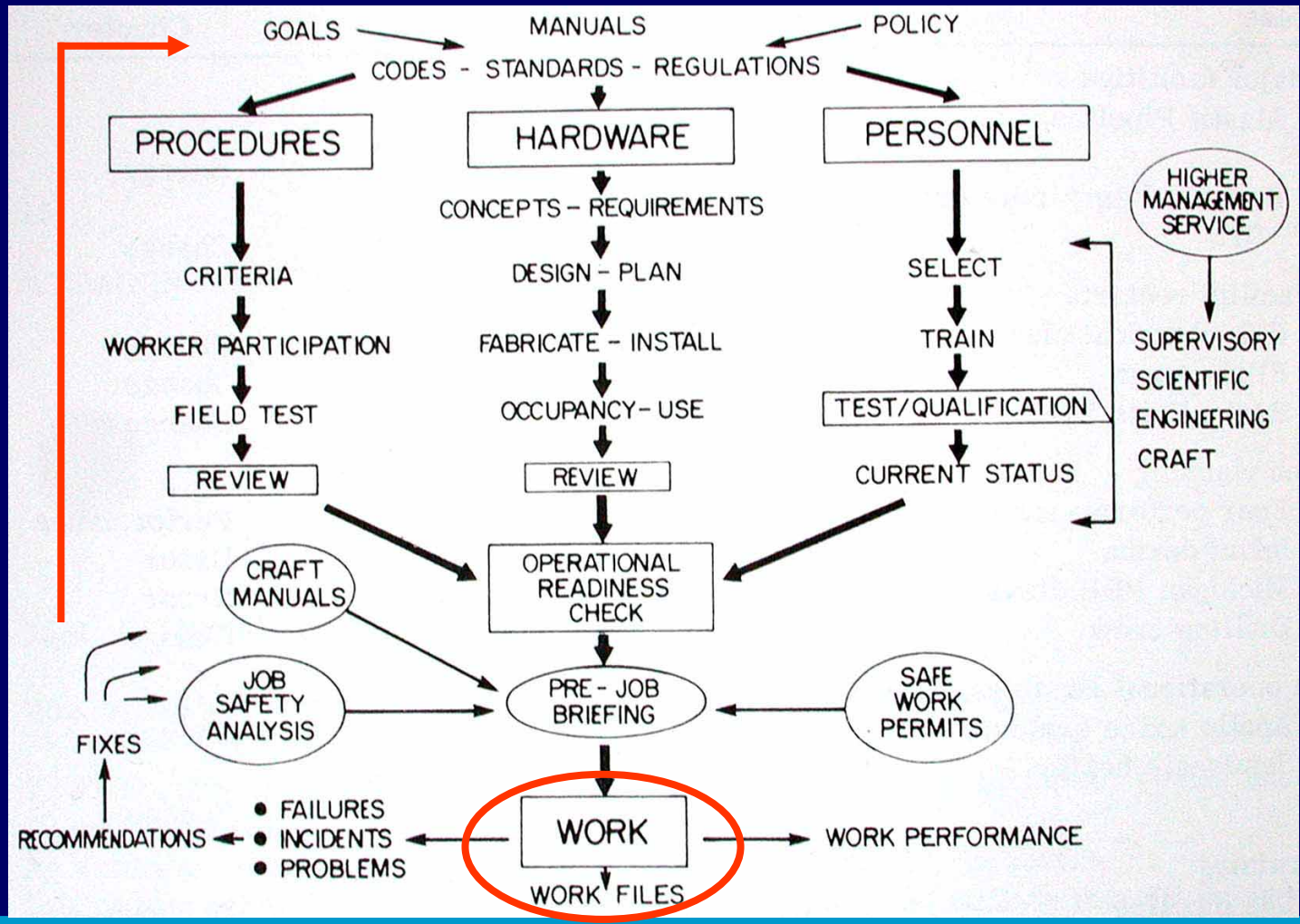
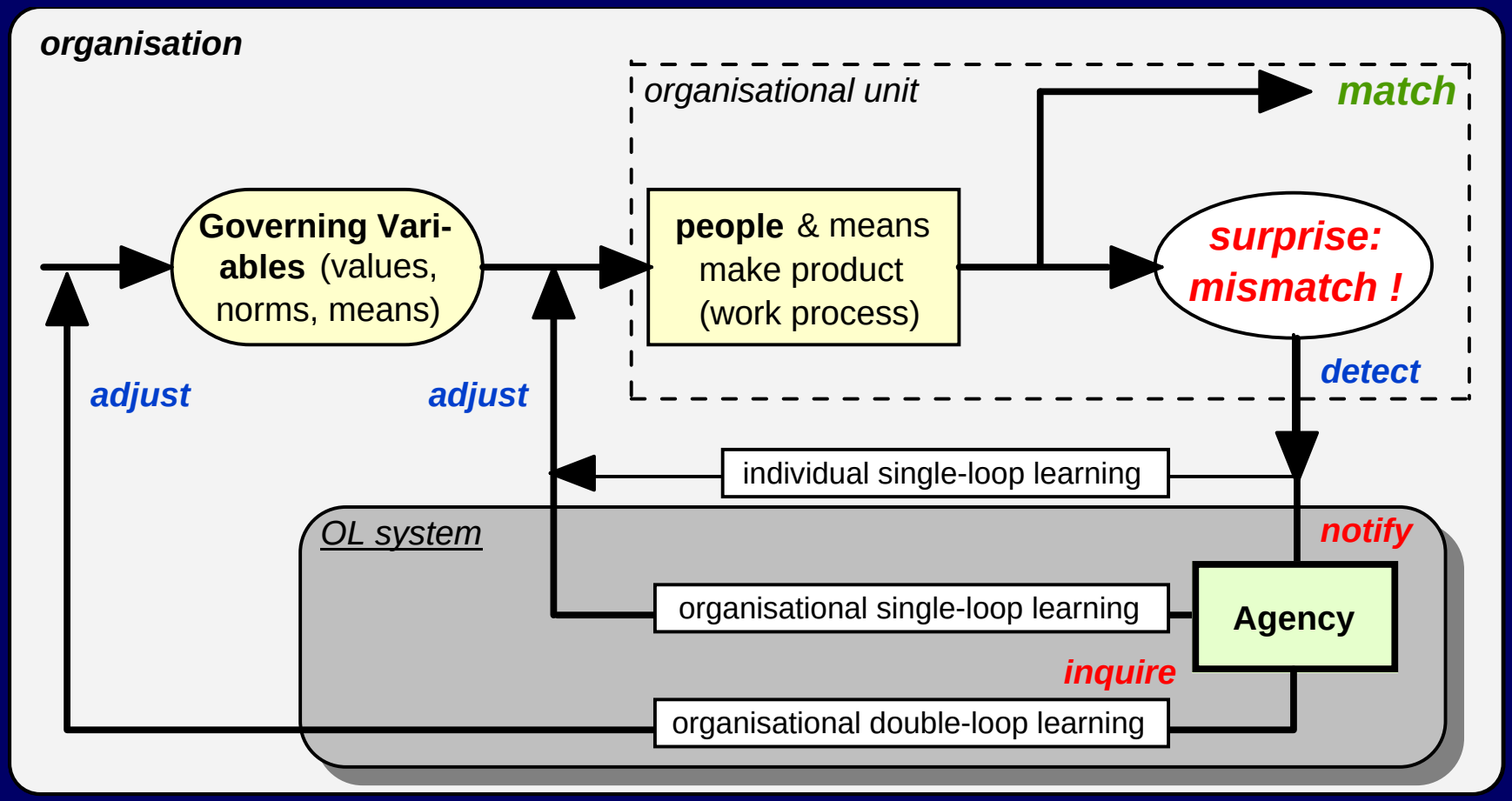
Upstream Processes

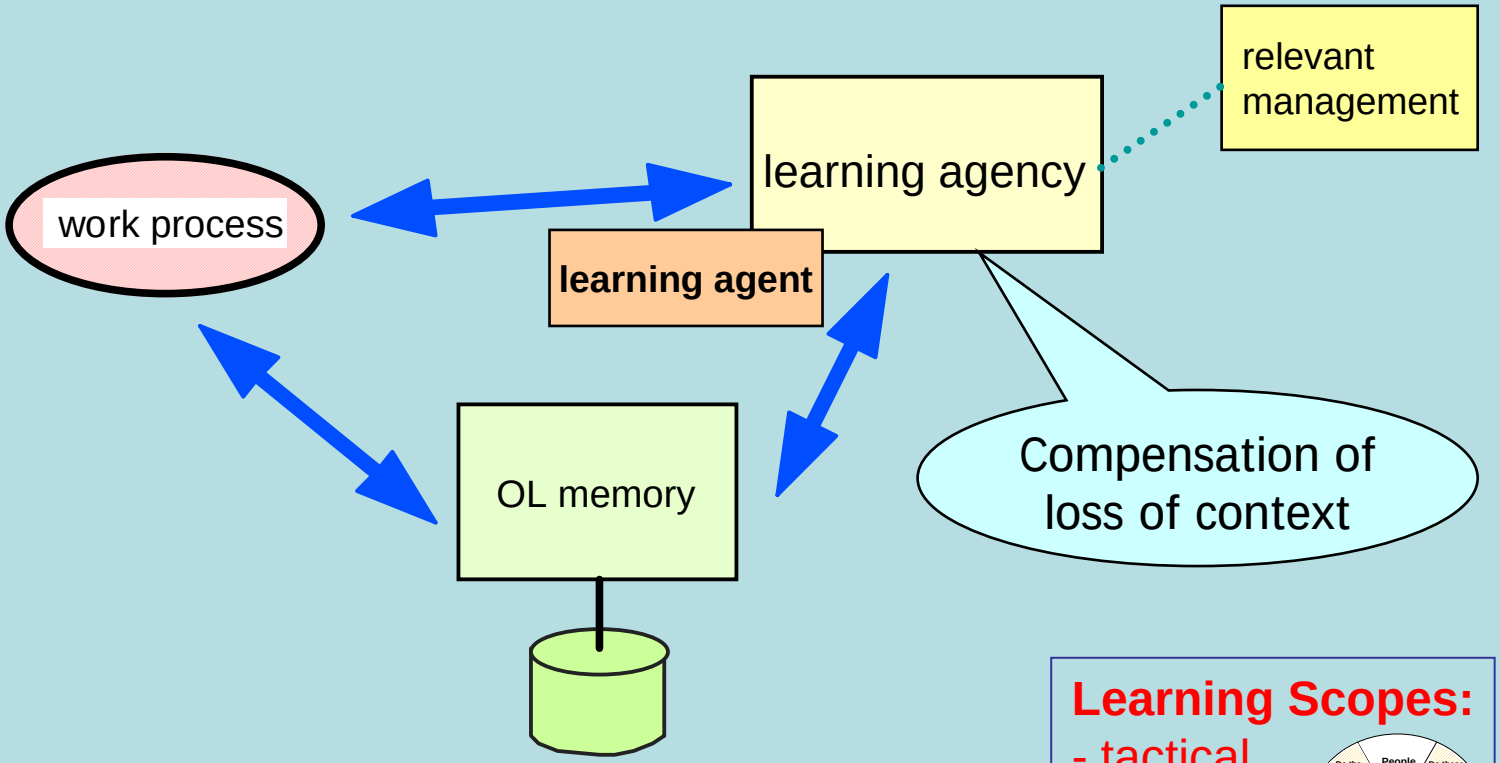


Organisational Learning
from Operational Surprises



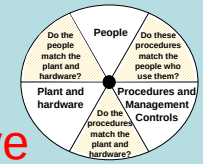
Learning = CHANGE!

Basic components in processes of Organisational Learning: SOL-model

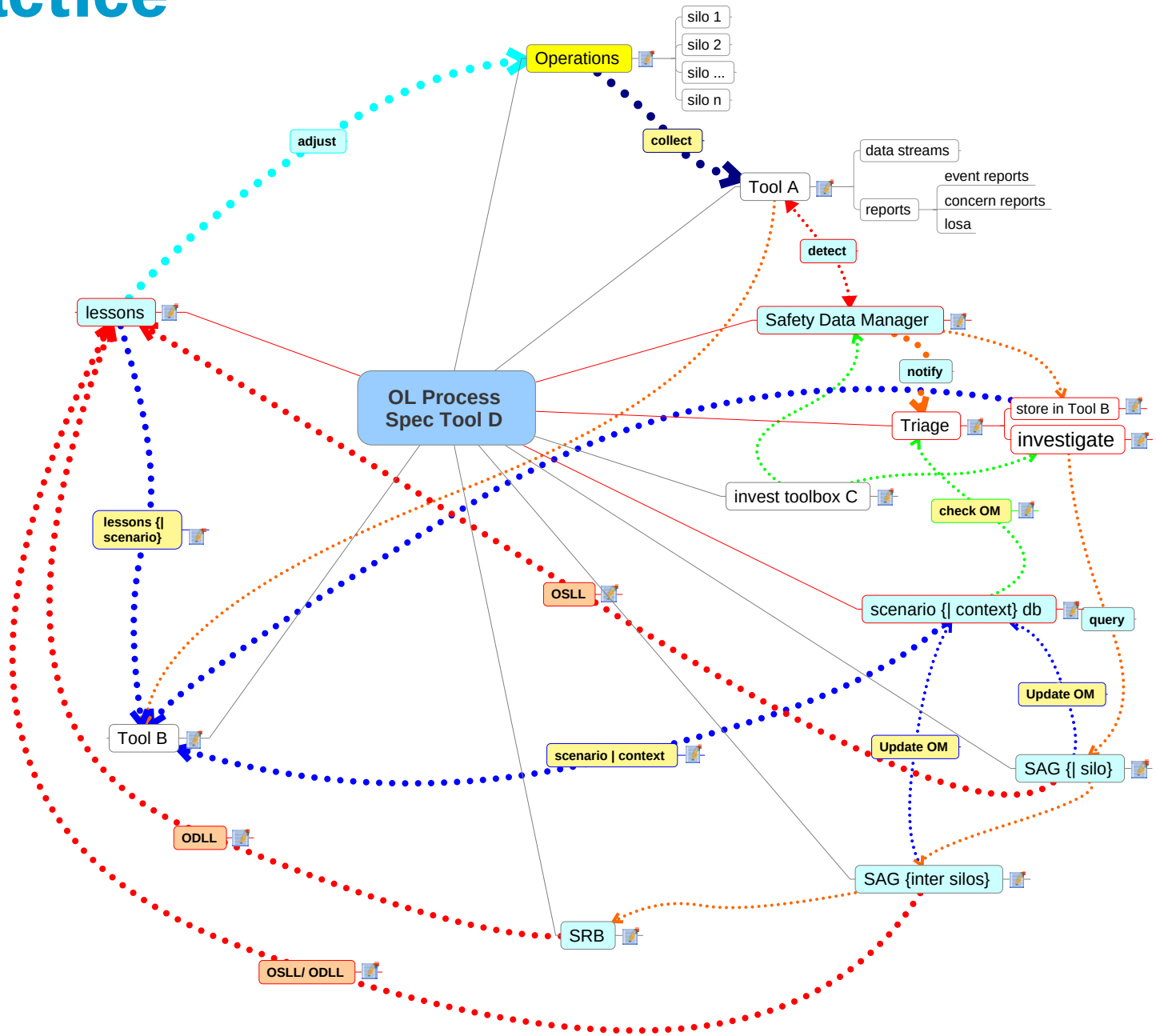


...needs to be organised

Learning Scopes:
- tactical
- strategic
- evaluative
- explorative



SOL in Practice



OL/OM system + functions

Org. Single/Double Loop Learning flow

Blue line: data stream

Red line: action stream

Green line: reuse of knowledge / means

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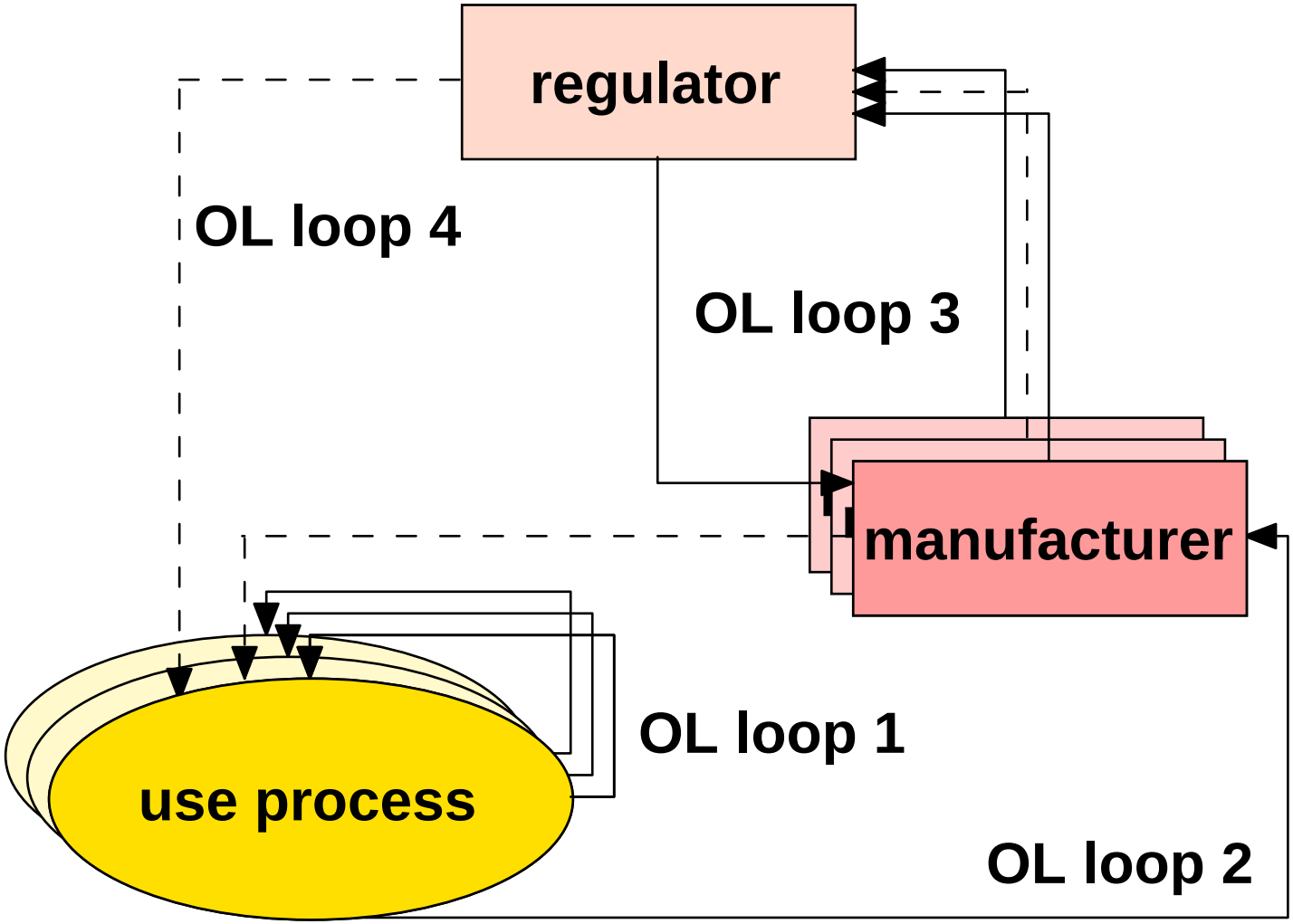
Multiple-Actors Learning Loops



Some Findings

- intra-organisational learning ⇔ inter-organisational learning ⇔ silos / departments / business units / contractors
  - sharing… {data, problems, blockers, lessons; | context (origin, reuse)}
  - transformation {| context; decision criteria}
  - personalisation
- human resources for learning for the organisation are often in place, but not very well lined up: room for improvement!
- organisational memory for reuse of lessons learned is practically lacking
- focus on WHAT to LEARN is lacking in initial data collection
  - Operational Readiness & maintaining it ⇔ resilience
- airlines share critical aircraft experiences primarily via the manufacturer

Key Issues

1. Organisational Learning from Experience in Aviation
   - problem solving process (reactive, proactive, evaluative, explorative)
   - Learning Agency <-> staff in "back-office": content-in-context; competence

   Organisational Memory in Aviation (access, usability, maintenance)

2. Intra-organisational learning ⇔ Inter-organisational learning
   - sharing...criteria, markers for types of scenario and context; network
     - potential conflict of interest
     - varying information needs {content; timing}
   - transformation {| context; criteria}
   - methodology to bridge sharing risk information and capacities + inclusion in decision support (ANP/AHP)

3. Management commitment... is crucial

4. Implementing OL/OM in aviation (yet within HILAS)
   - OL/OM principles described and applicable
   - 'white box' approach needed to tailor OL/OM to current practices
   - verification and validation in other companies (2008-2009)
   - guideline with 'muddy box' approach to support self-development

Conclusions about key Issues in OL

- we discussed generic requirements for a successful learning system in the aviation sector
- the role of handling and transformation of context when learning from performance / experiences is critical
- we are close to identify facilitators that help aviation organisations to improve their capacity for learning from experiences and sharing risk information