UNIVERSITY OF CAMBRIDGE
Institute for Manufacturing

AUTO-ID LABS

The Impact of ID Technologies on Aircraft Turnaround Processes

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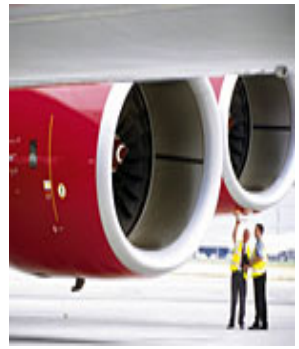
Airport Services Research Programme

Aim: Industrial research programme investigating the impact that ID Technologies will have on Aircraft turnaround processes.

Funded by IATA & SITA
Duration (January – August 2007)

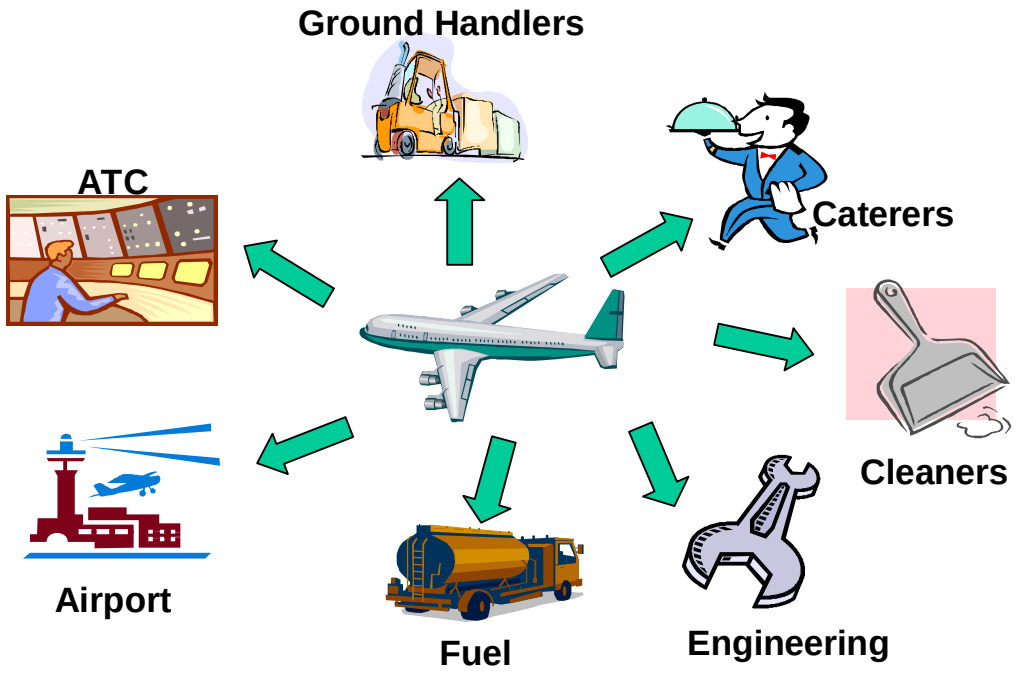


- How can ID technologies enhance aircraft turnaround processes, improving punctuality and provide better robustness to disturbances ?

- How can data sharing between turnaround partners provide better process visibility and new business opportunities ?

The perfect turnaround a challenge?

- Successful turnaround requires close interaction between turnaround partners in a timely fashion!



- Different partners interact at different airport locations.
- Processes vary depending on aircraft type and partners involved.

Are on time departures are a problem?

- The need for airlines to minimise costs and improve on time departures is greater than ever.
- 10 largest UK airports - **380,234 departures** (6 months to Nov 05).
- The average departure delay was **17.4 minutes**.
- Equating to departure delays of over **605 hours** (25 days) every day.
- Estimated cost of UK departure delays in 2005 over **£650m.**

Activities to be carried out in the research

1 **Capture requirements & turnaround issues (Short haul, Long Haul, Cargo Operations)**

2 **Enhance ID analysis tools for turnaround (Extend Cambridge's current tool set)**

3 **Site analysis of turnaround processes (Observe turnaround activities)**

4 **Propose new improved processes and benefits (Adoption Strategies for ID technologies)**

Focused Trial Activities (Research Partners)

Phase 1. Results.
Impact analysis of historic delay data.

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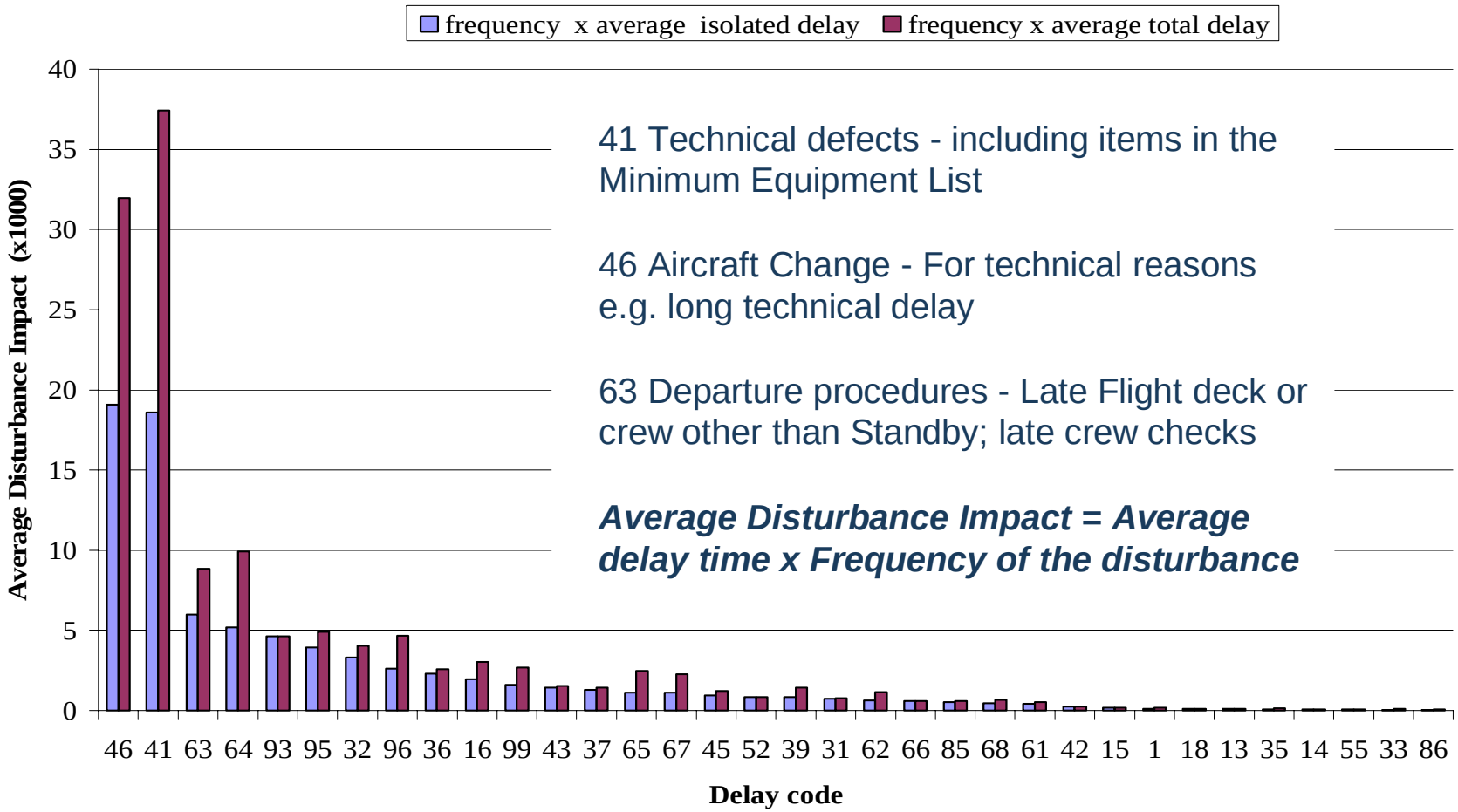
Currently extending work into Long haul & Cargo Operations.



Delay codes used by Airlines, Airports and Handling organisations. (IATA Standards)

Phase 1. Results
Future turnaround requirements.

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Zero excess fuel requirements: Carrying excess fuel has to be kept to safe minimums.

Better utilisation of aircraft: Ensuring that the time that an aircraft is on the ground is kept to a minimum.

Long haul passenger / cargo mix: Today it is very important that spare hold capacity on scheduled flights is utilised.

Last minute cargo drop off: Today we are seeing cargo operations providing ever tighter delivery windows.

Reduced number of staff involved in turnaround operations: Many airlines and handling organisations no longer make use of the traditional redcap. (Ramp Co-ordinator)

Phase 1. Results
ID technology applications in turnaround processes

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- Tracking of baggage and passengers
- Improve tracking of turnaround equipment
- Accurate ULD tracking / reducing auditing process
- Configuration control of aircraft safety equipment
- Optimum turnaround to meet service agreements
- Reduce repair and maintenance times
- Provide maintenance manuals / information guides
- Tracking & status information on specialised tooling
- Optimize warehouse utilisation & throughput
- Warn of hazardous material loading configurations
- Accurate tracking of catering trolleys

Phase 2. Under development.
Enhance tools & methods for analysing turnaround.

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• Provide an accurate and repeatable method to capture turnaround processes:

- Identifying the key decision points
- Related information flows
- Operational interactions & dependencies
- Critical path analysis

• Identify how ID technologies can improve turnaround processes. (Reflect on evolving turnaround requirements)

- Providing improve performance (Speed, Flexibility)
- Robustness to operational disturbances
- Provide enhance functionality (Improved Decisions)

Phase 3. Under development.
Manual processes linked to ID technologies.

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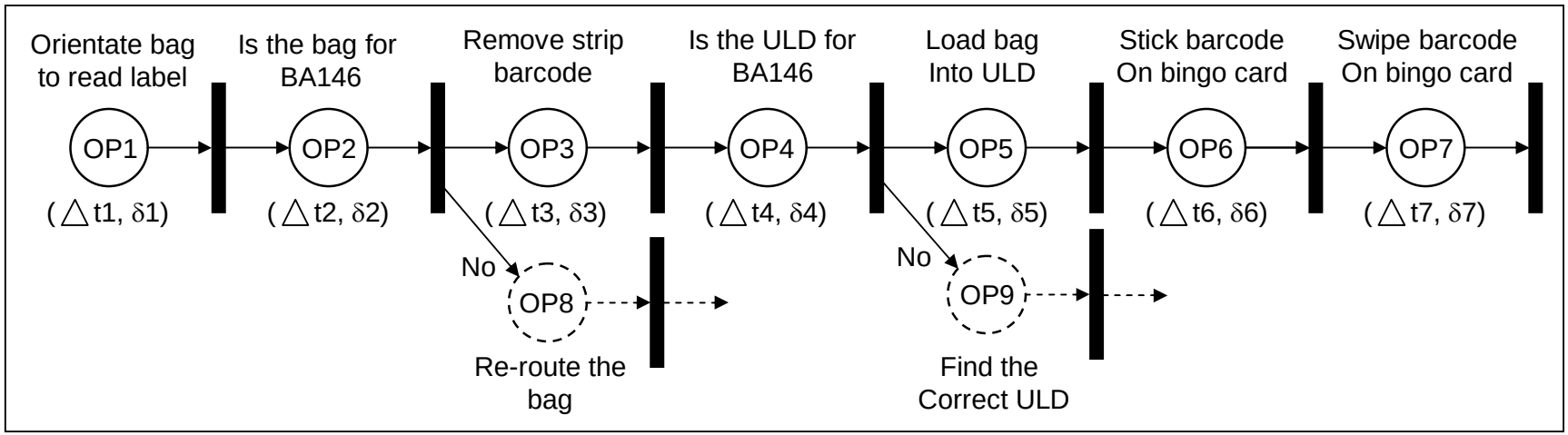
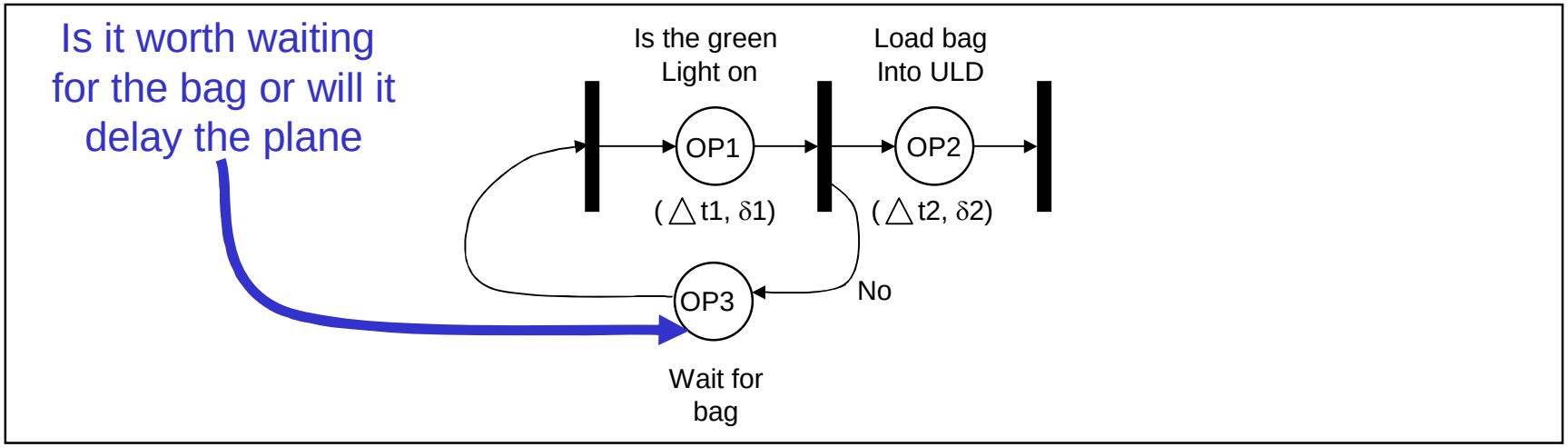
Bar Code enabled ULD loading (Process)



RFID enabled ULD loading (Process)



Phase 3. Under development.
Enhance functionality through data sharing.

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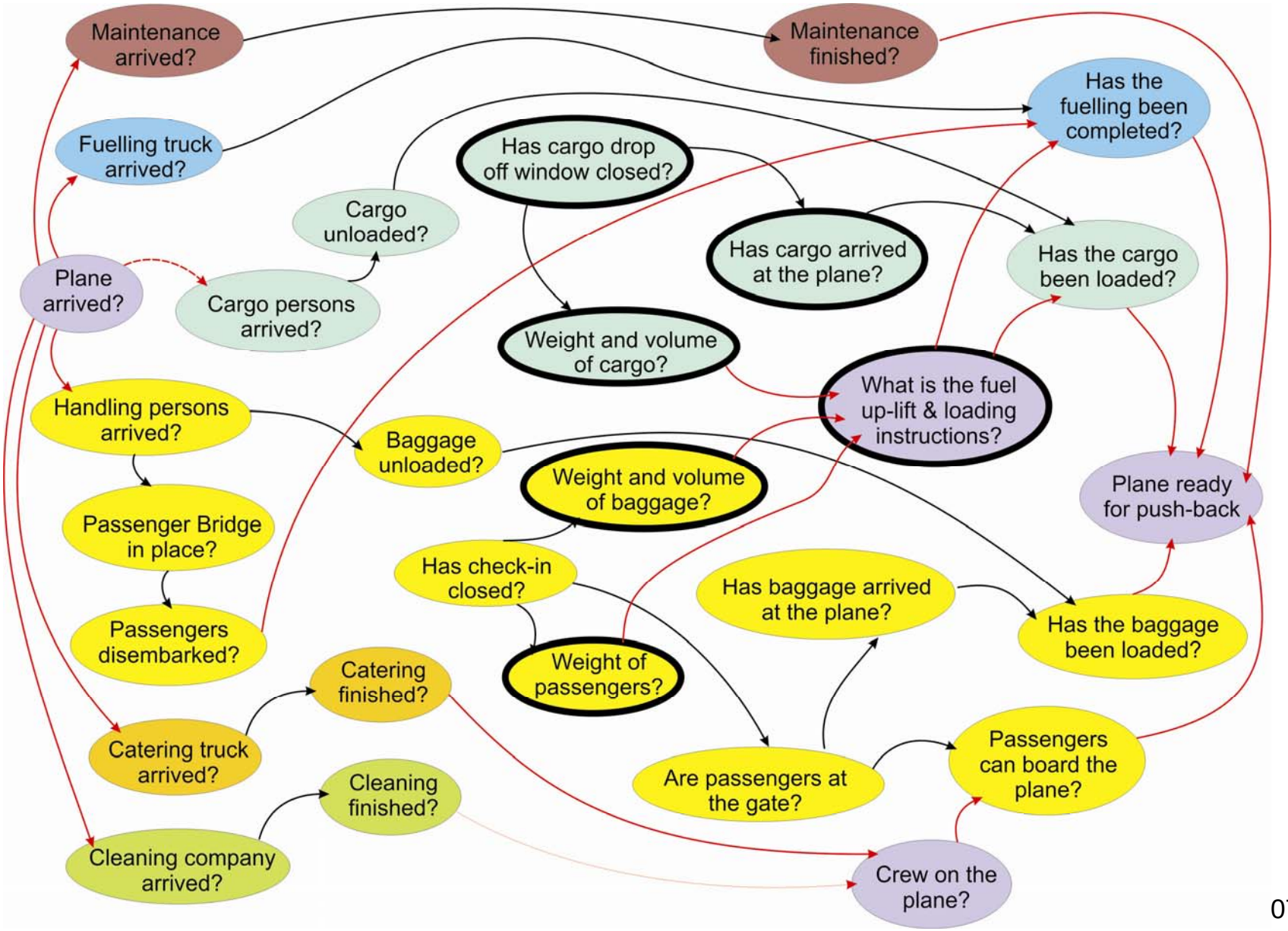

Observations:

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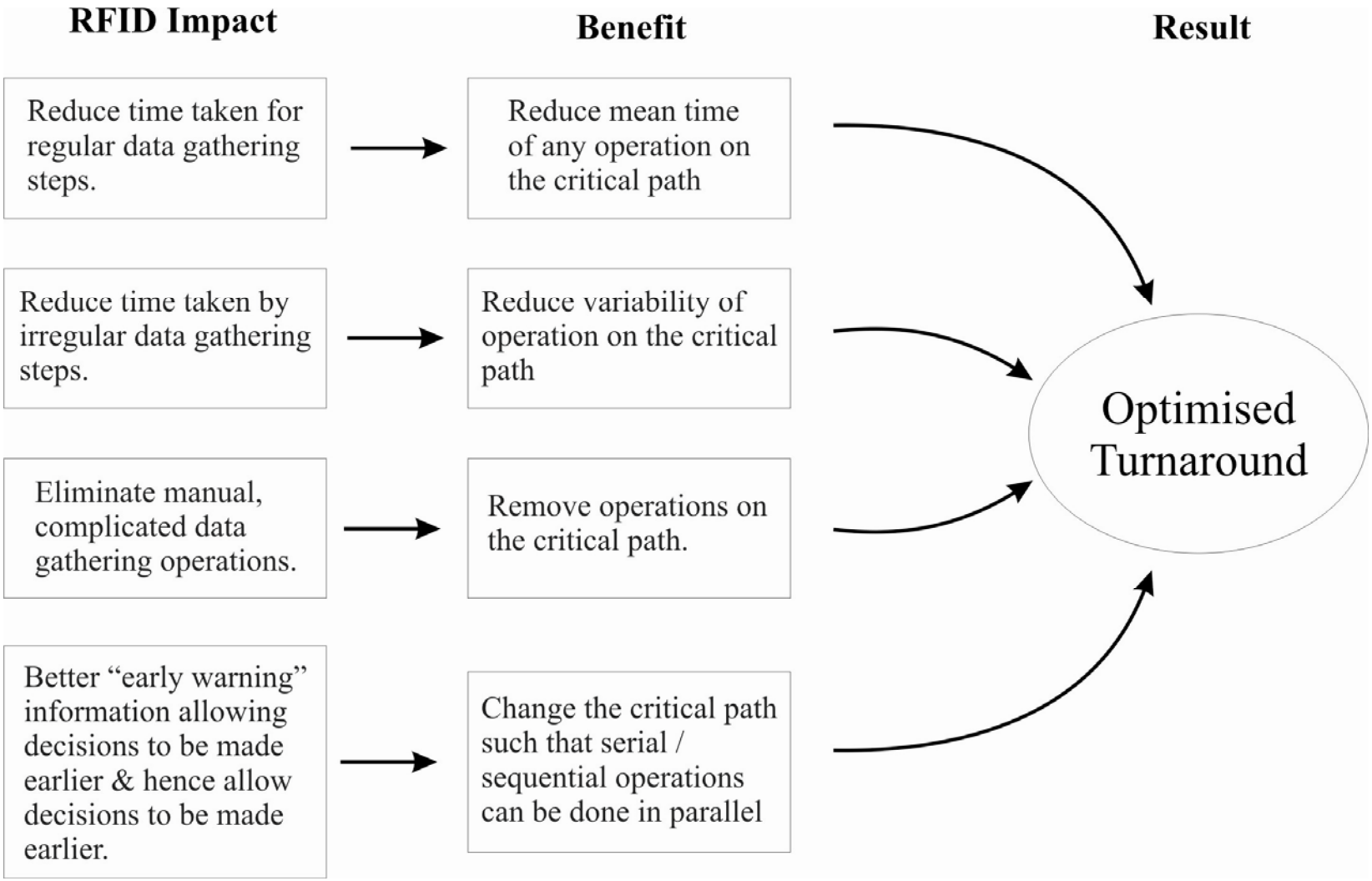

Conclusion:
Better Information = Smarter Turnaround

A number of opportunities within turnaround process that can benefit from the use of ID technologies & data sharing.

- Improved turnaround performance:
  - Reduce the number of operational processes.
  - Reduce operational times (Capturing ID information).
  - Provide known levels of flexibility.

- More robust and agile operation:
  - Better visibility of turnaround processes (Internally/Externally).
  - Reduce number of unexpected variations.
  - Agile turnaround reacting to observed problems.

- Opportunistic business response:
  - Exploit delays / disruptions for new business opportunities. (e.g. additional cargo, reduced baggage delay costs)