Enabling Autonomy in Aircraft Towing Operations

A case study utilizing the towing driver's perspective at KLM Royal Dutch Airlines

KLM

01 WHY, WHAT & WHERE

Through its Back-on-Track program, KLM aims to improve the operational efficiency of aircraft towing operations at Hangar 12. Currently, KLM uses a remote-controlled towing vehicle called the Mototok, requiring six operators to be involved in the towing process. This project aims to make the Mototok towing process more autonomous.

## 02 THE NEXT AUTONOMY LEVEL OF TOWING

To determine where autonomy can be introduced, a framework was developed, taking inputs from the towing drivers into account. The inputs were categorized based on functionality and information flow, and combined with safety requirements to derive an area of autonomy. This was further combined with a theoretical framework of autonomy levels to determine the level of autonomy.
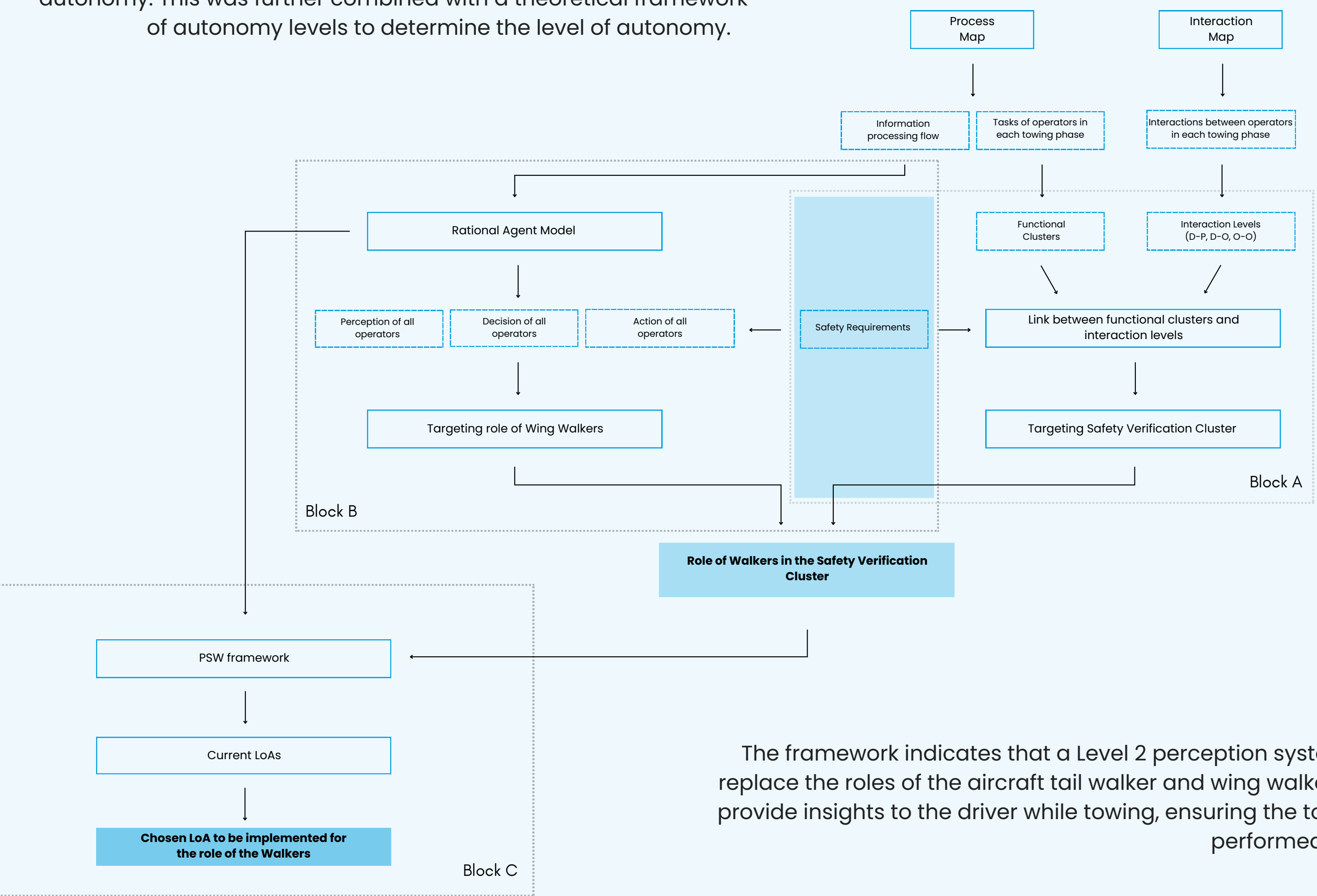
The framework indicates that a Level 2 perception system can replace the roles of the aircraft tail walker and wing walkers who provide insights to the driver while towing, ensuring the towing is performed safely.

03 FACTORS FOR TESTING

Research showed that the introduction of autonomy would impact the decision-making of the driver. To understand its impact, the Critical Decision Method was used to derive a decision-making model. This model included decision-making under worst-case towing scenarios to identify potential edge cases where technology testing is necessary.
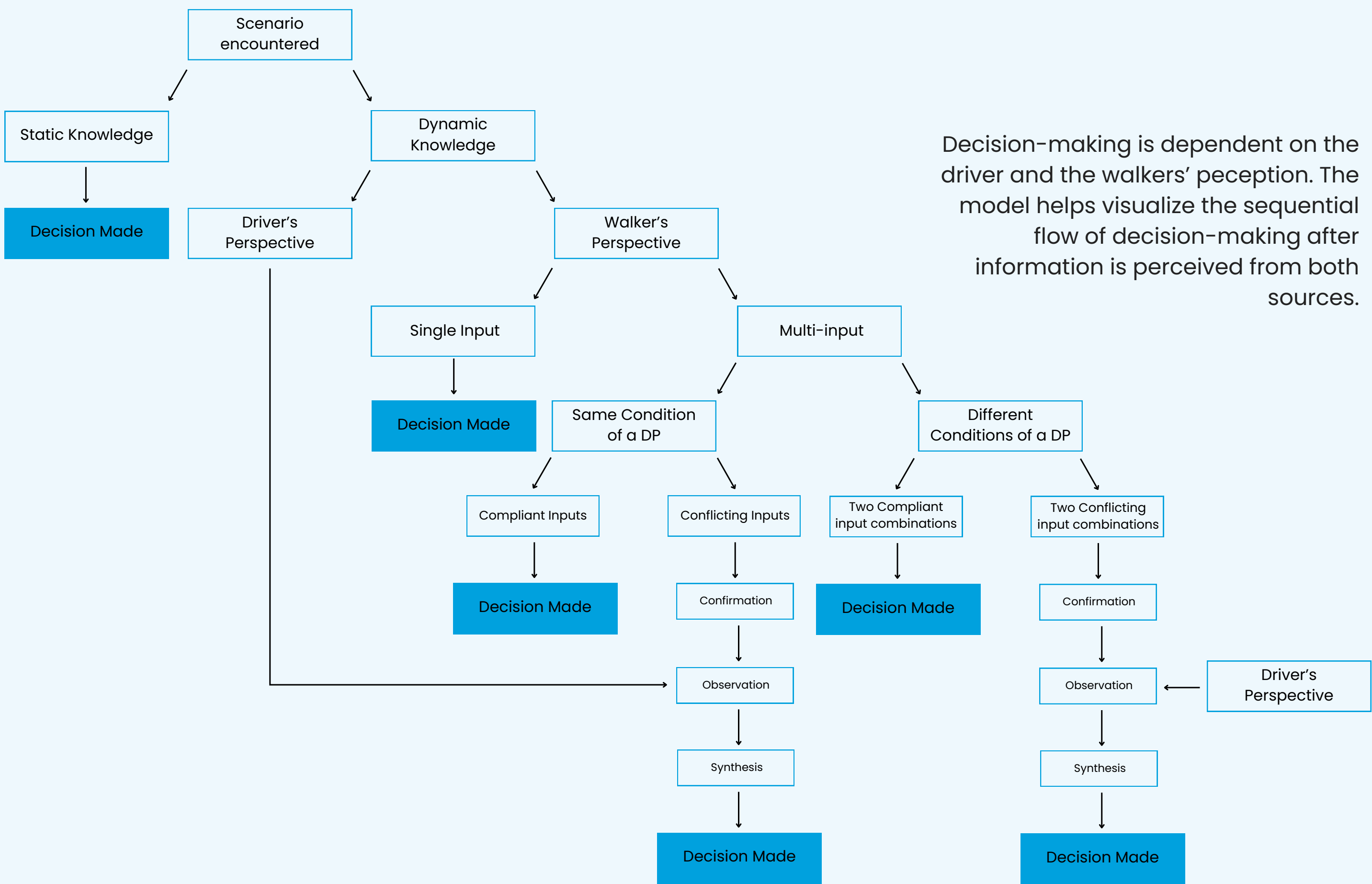
Decision-making is dependent on the driver and the walkers' peception. The model helps visualize the sequential flow of decision-making after information is perceived from both sources.

04 DELIVERABLES

A

Requirement to test the trust of the walkers in the perception system

B

Guidelines for an experiment to study and measure trust

C

A scaled-down experimental setup that can be used to train the drivers on using the perception system

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Integrated Product Design

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