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## Crew multi-criteria decision support tool estimating performance indicators and uncertainty

Luis Delgado is **Senior Research Fellow at the University of Westminster** where he works on **Air Transport Management** research. He specializes on the modelling of the ATM system with particular interest on delay management, and the consideration of different stakeholders (passengers in particular) and their trade-offs.





# Pilot3

Crew multi-criteria decision support tool estimating performance indicators and uncertainty

Luis Delgado, Gerald Gurtner and Andrew Cook  
University of Westminster

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# Consortium



# Advisory Board



Valentín Lago

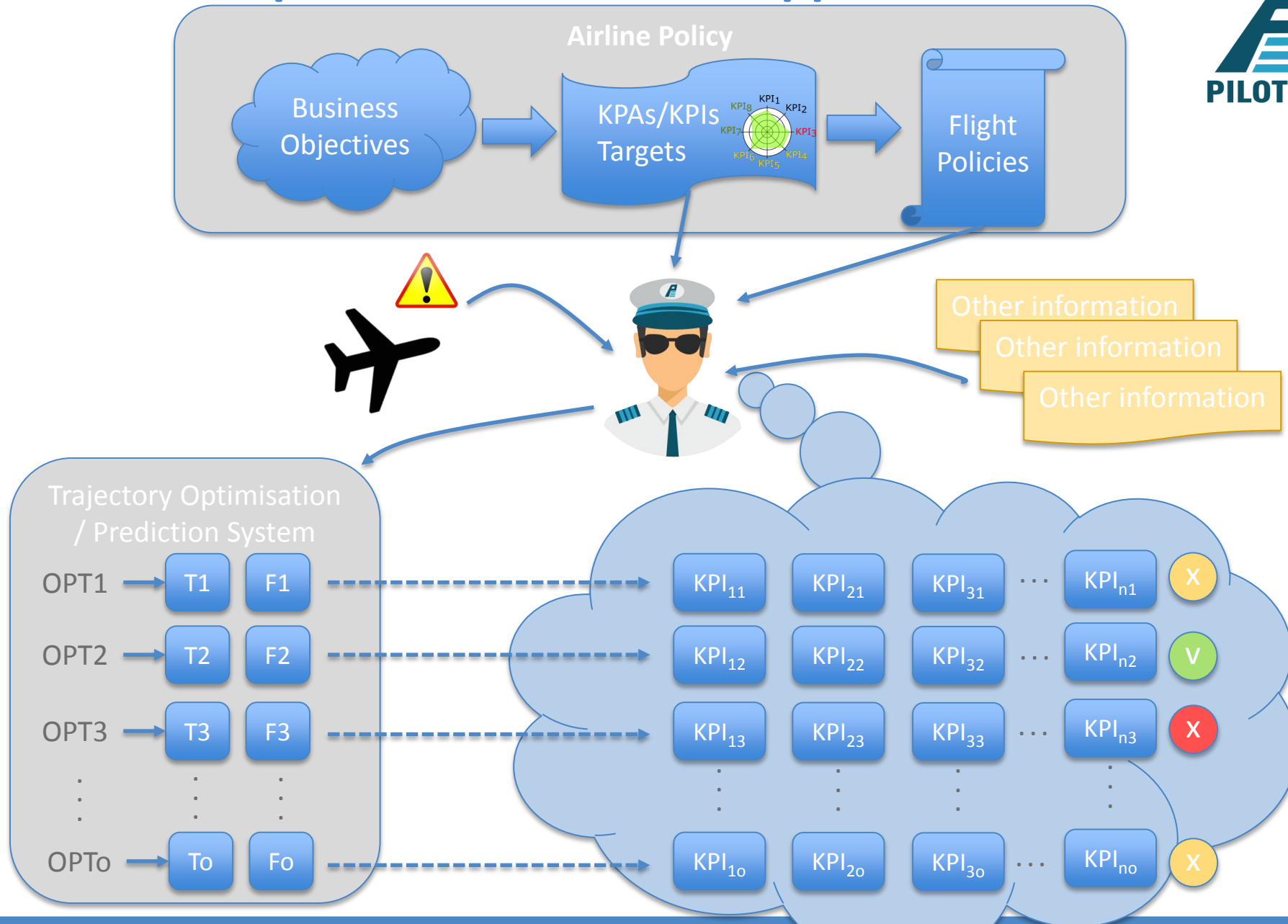
A3 Aviation Consulting



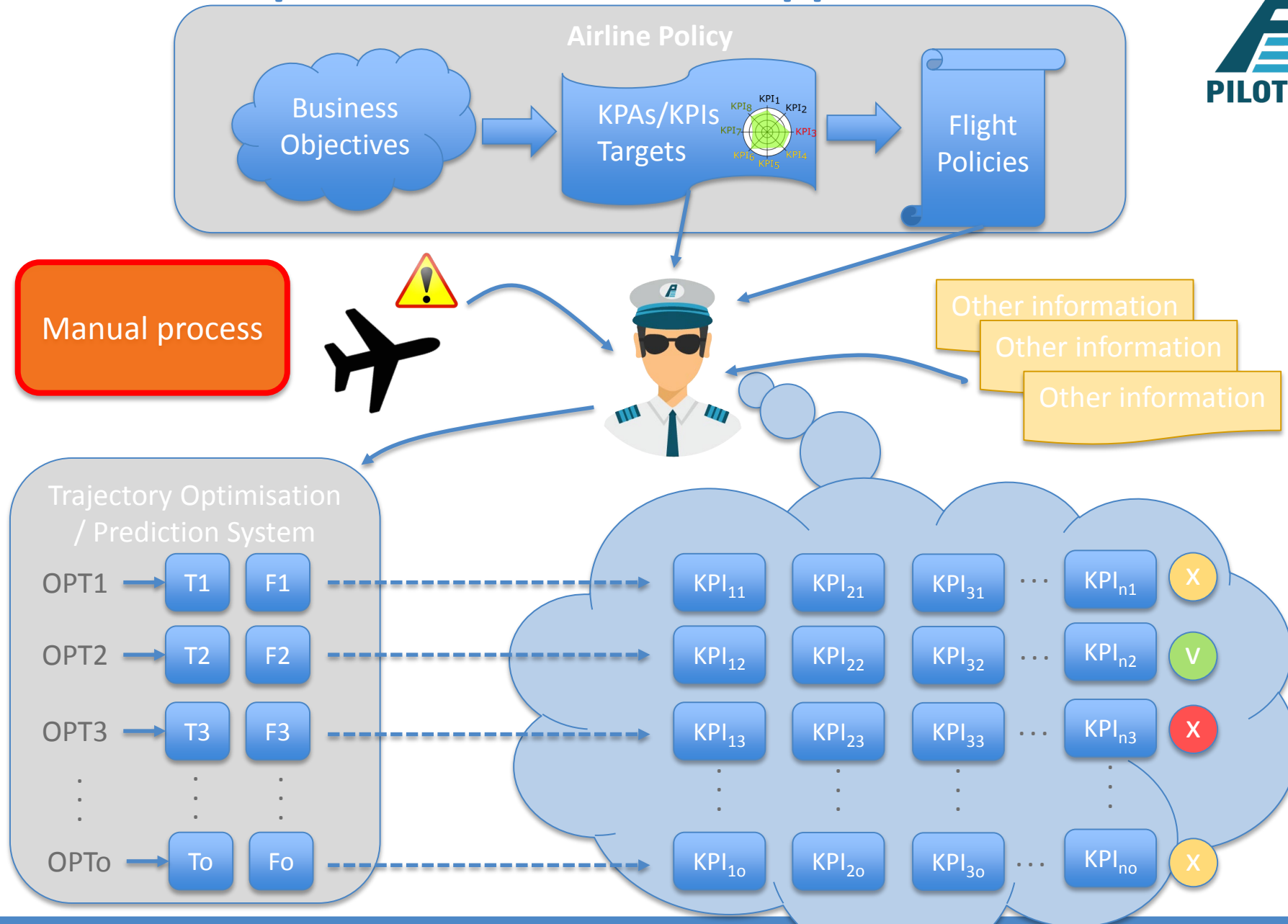


# Pilot3 – Project Overview

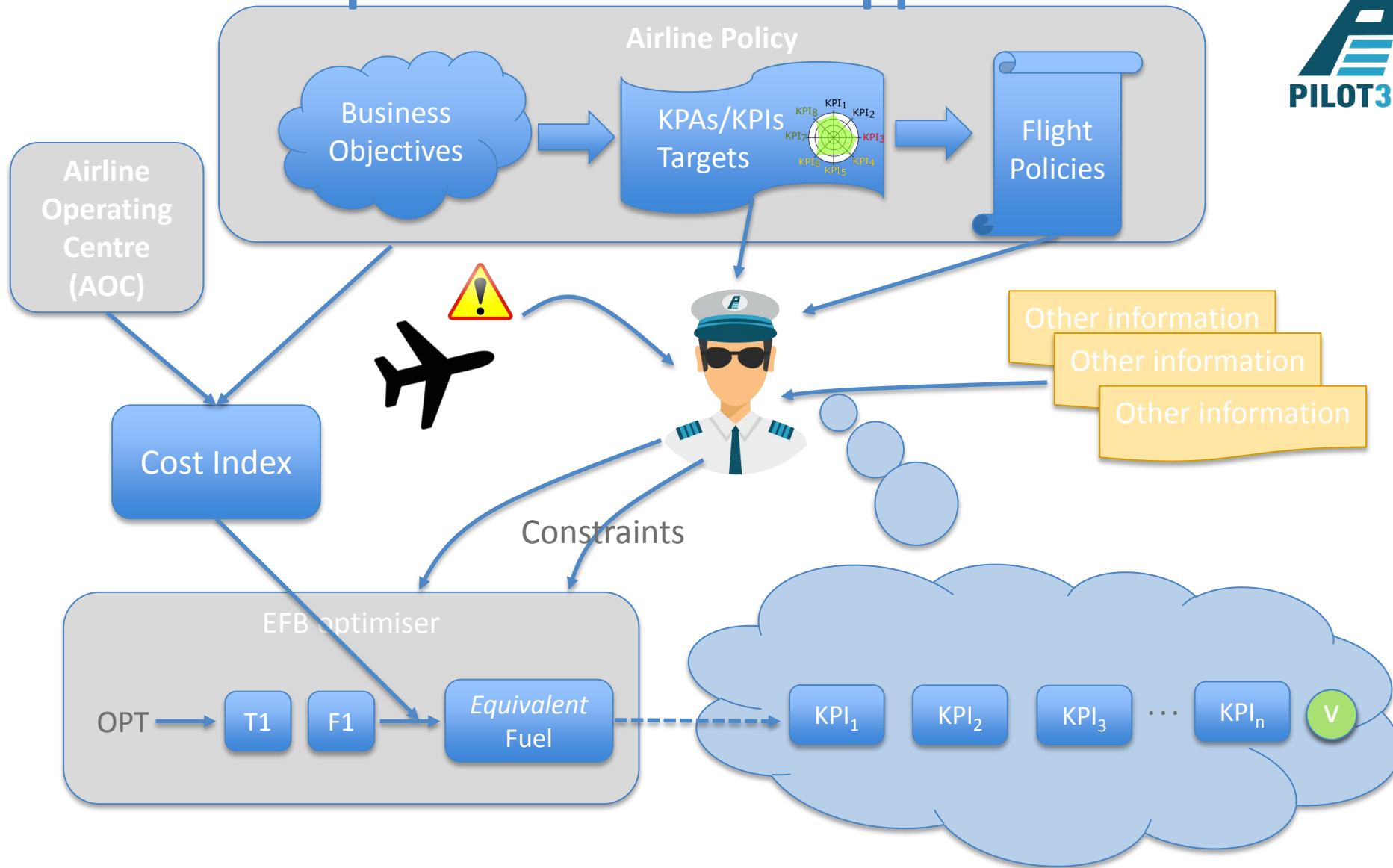
# Current Operations – Limited support tools



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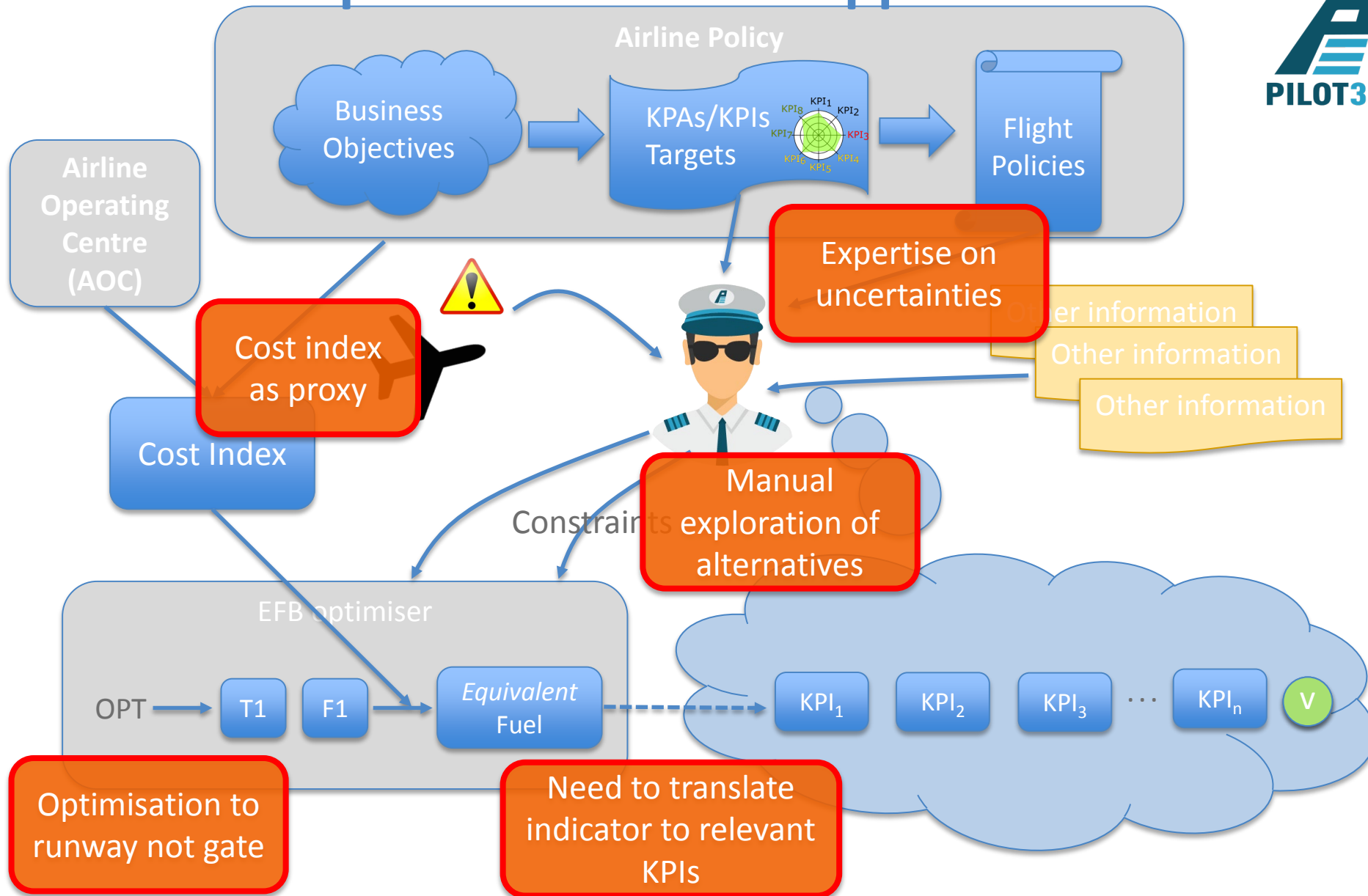


# Current Operations – With support tools

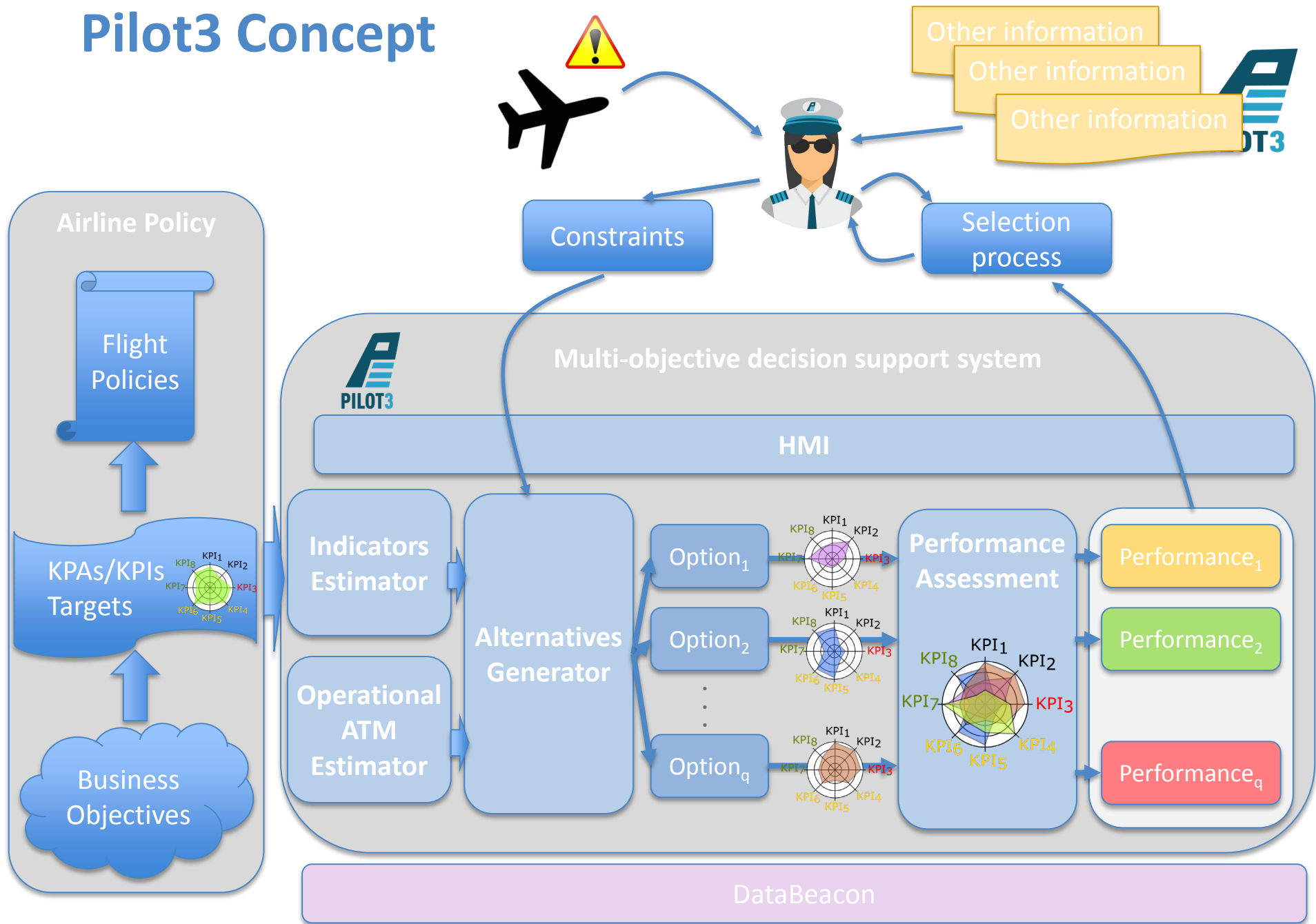




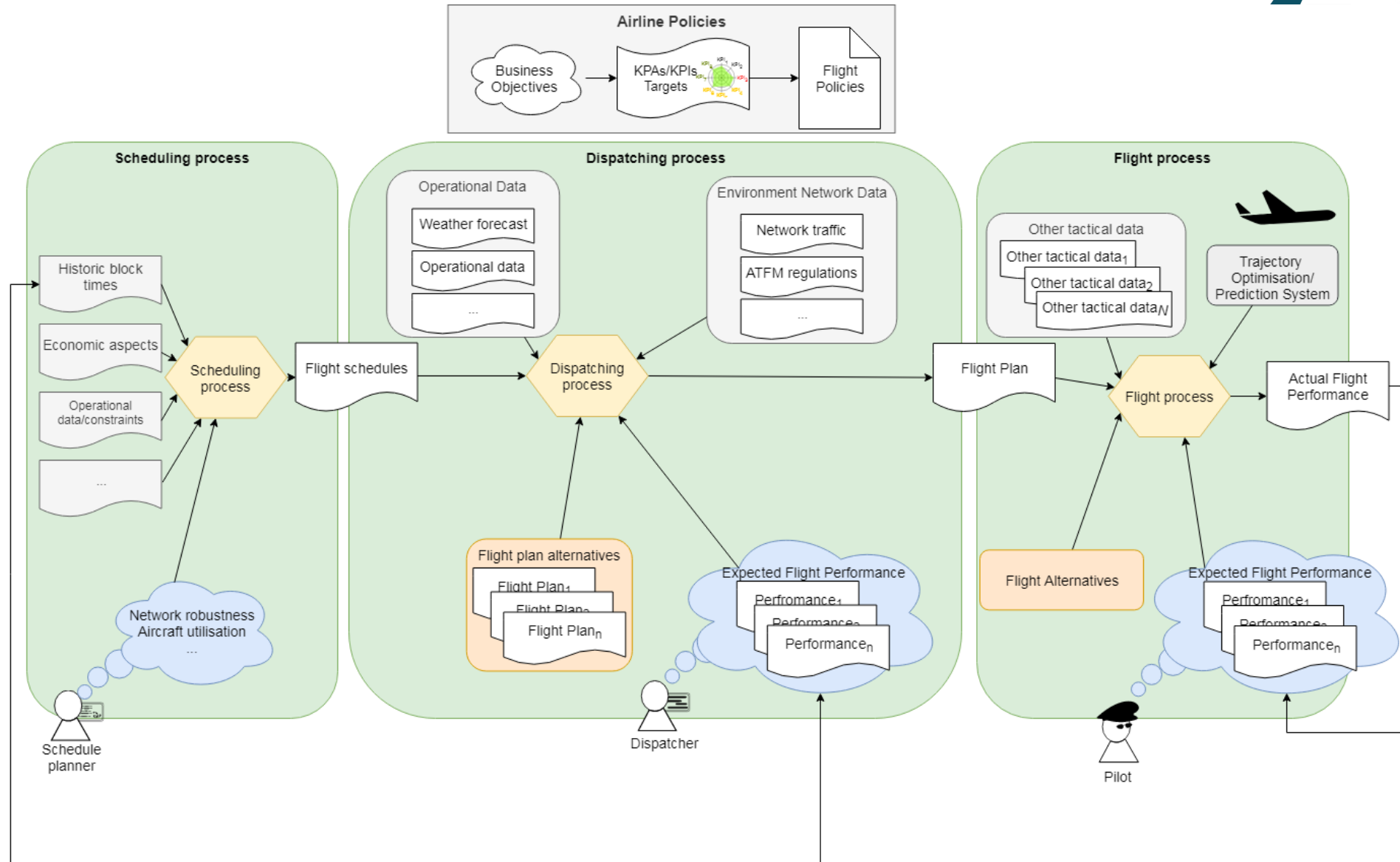
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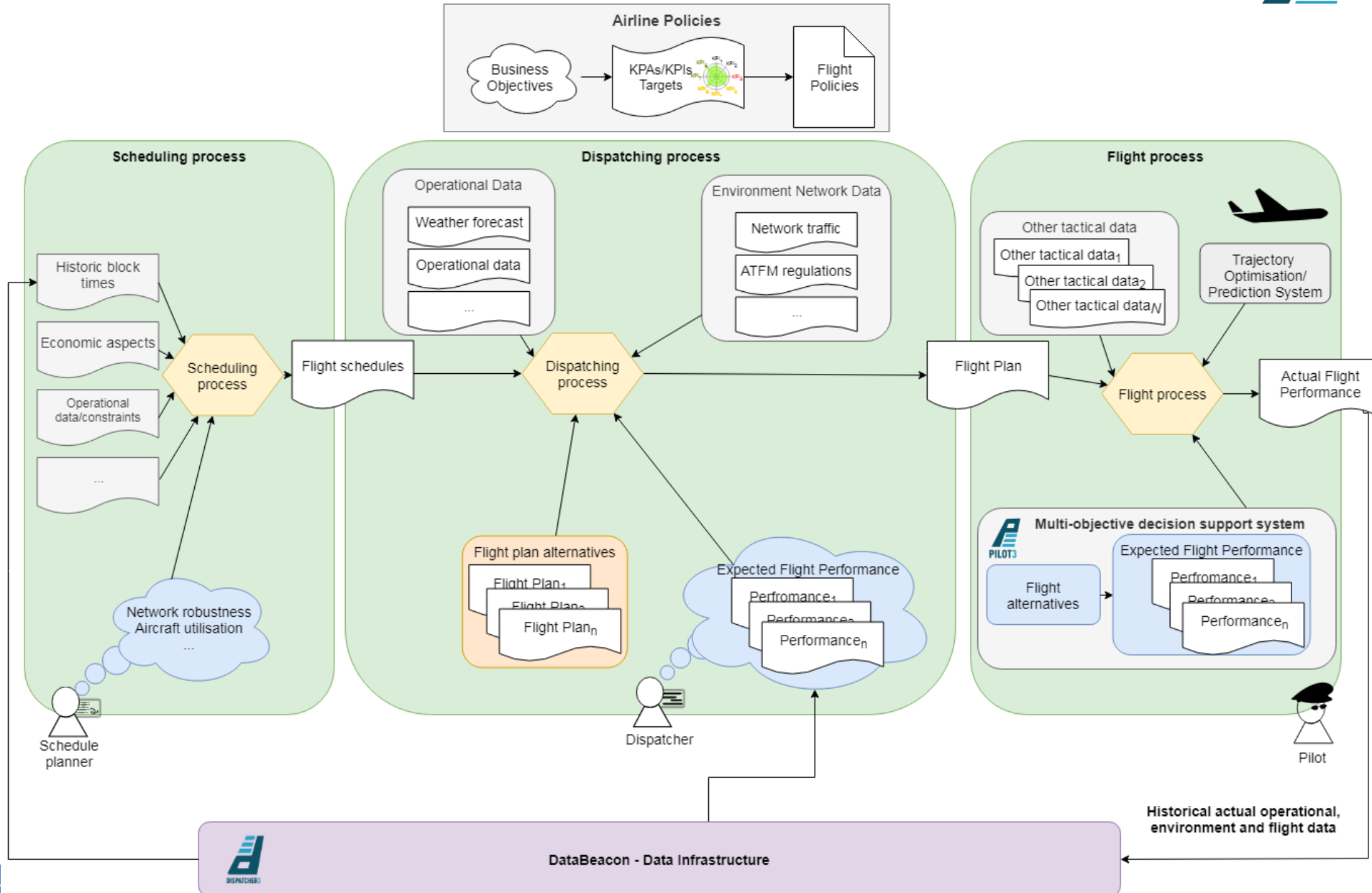
# Pilot3 Concept



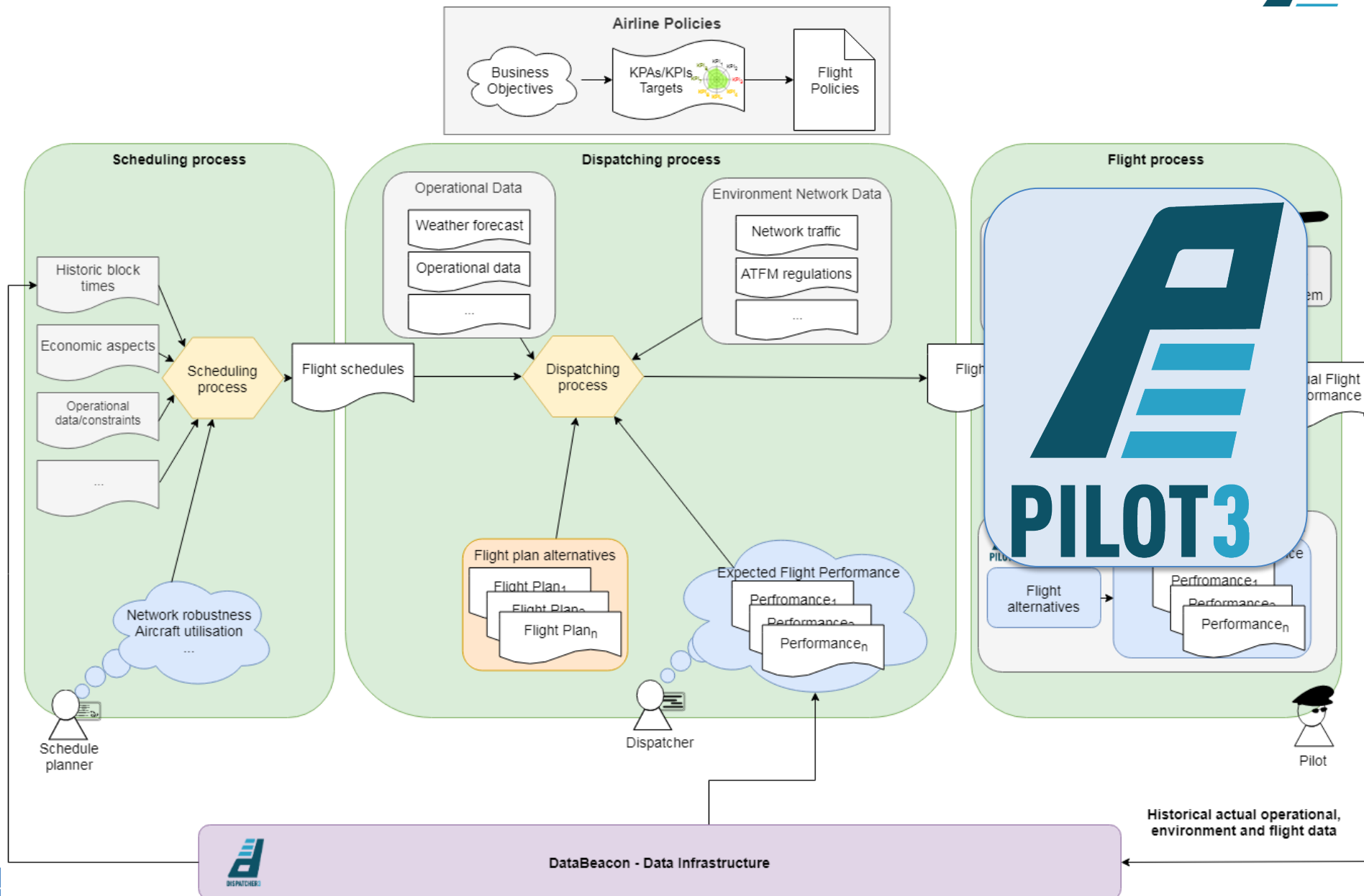
# Pilot3 in context



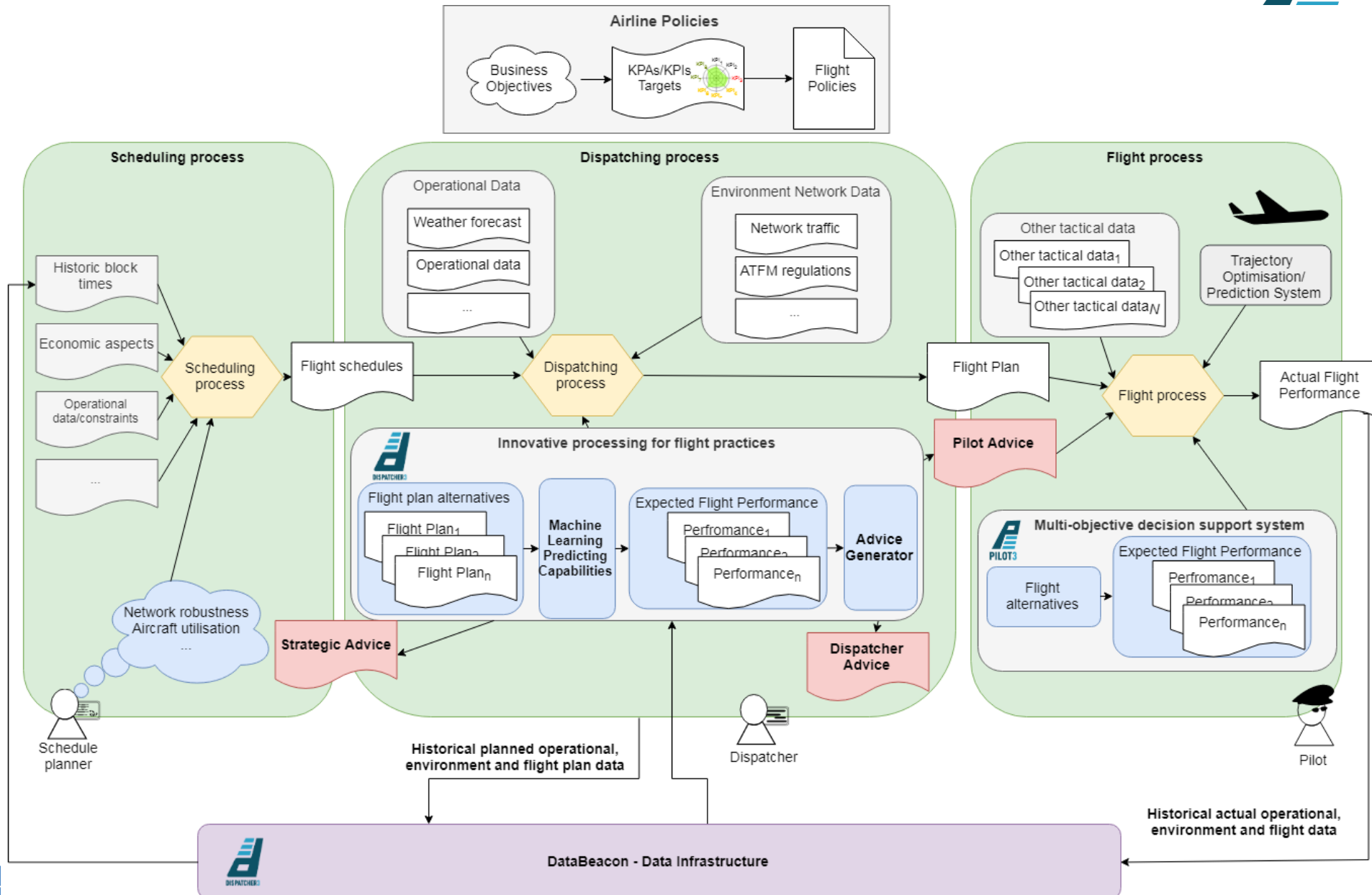
# Pilot3 in context



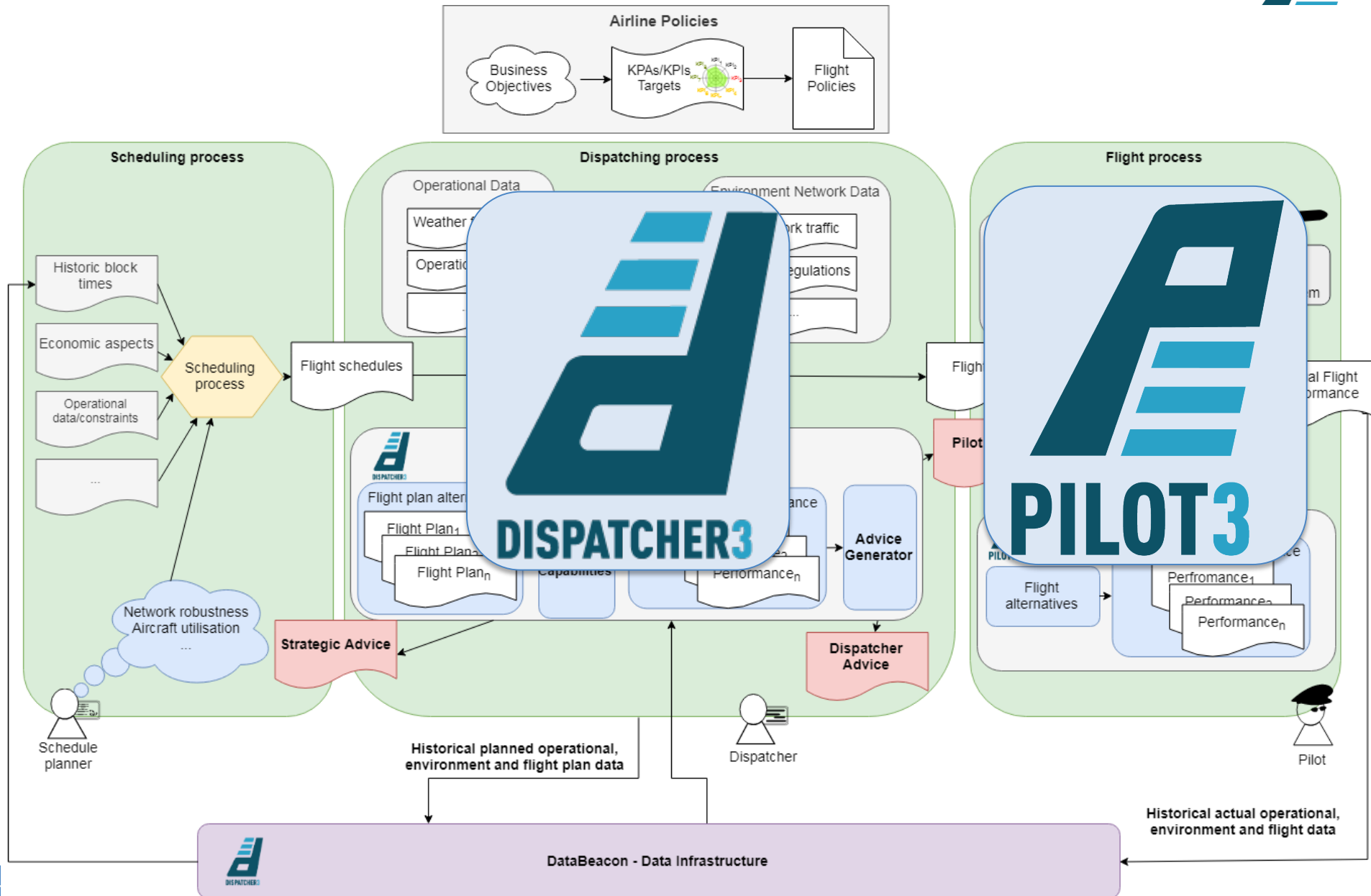
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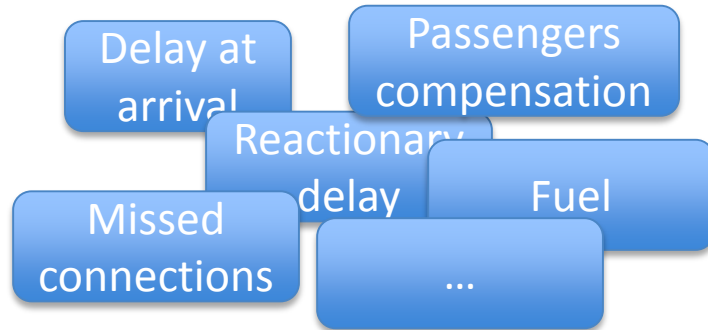
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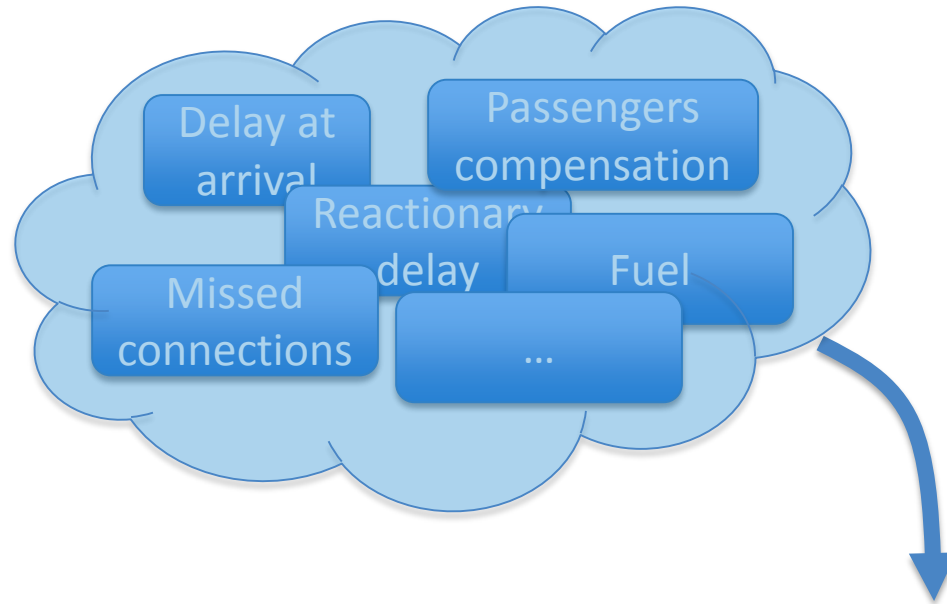
# Pilot3 KPIs considered



Insight from  
Advisory Board



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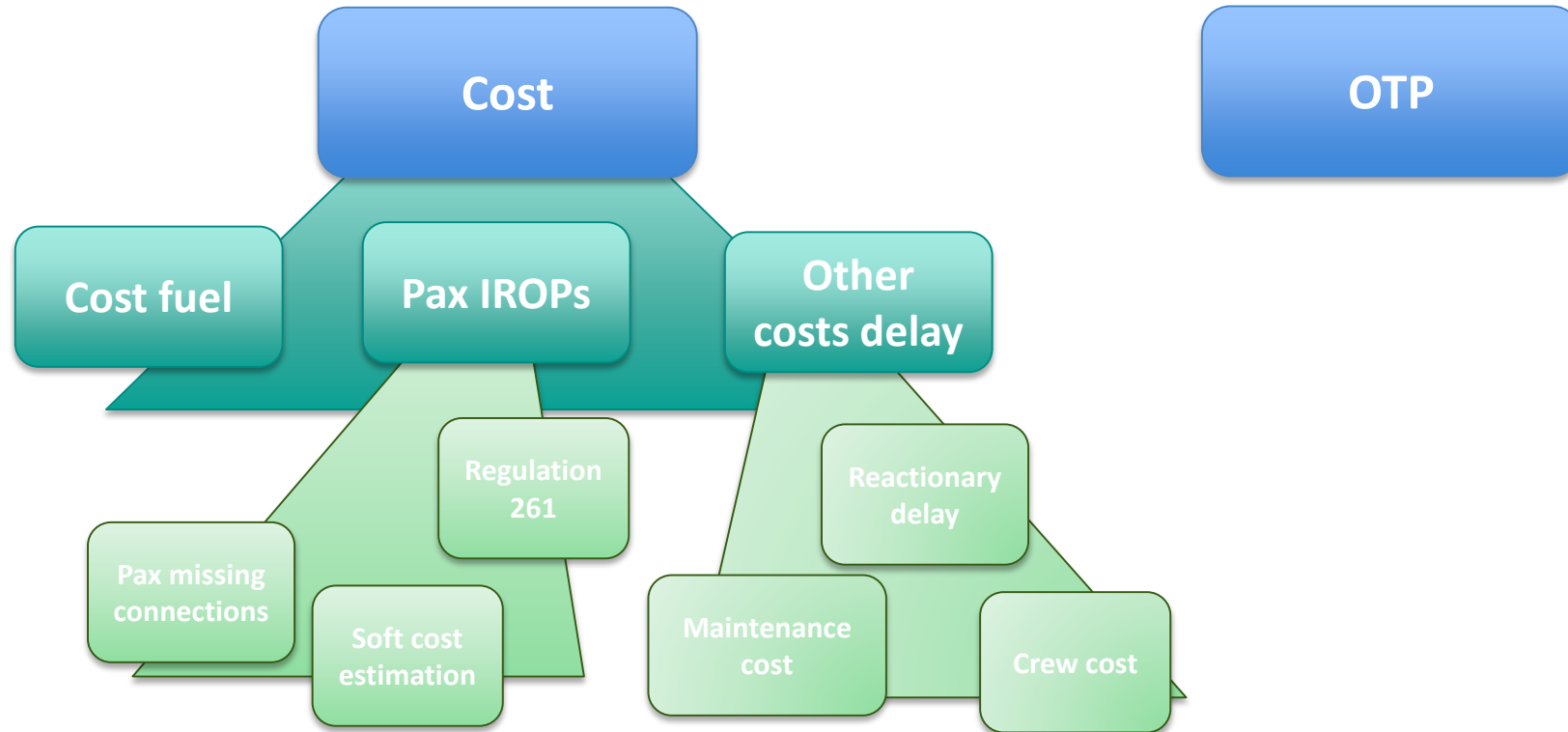


Insight from  
Advisory Board

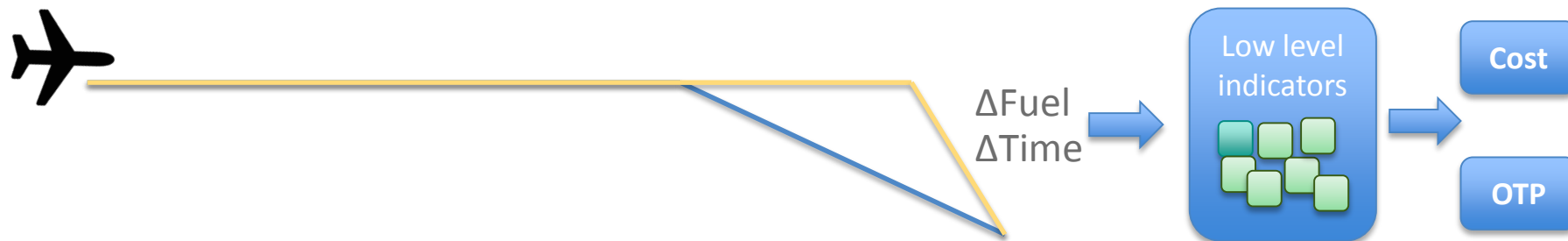
Cost

OTP

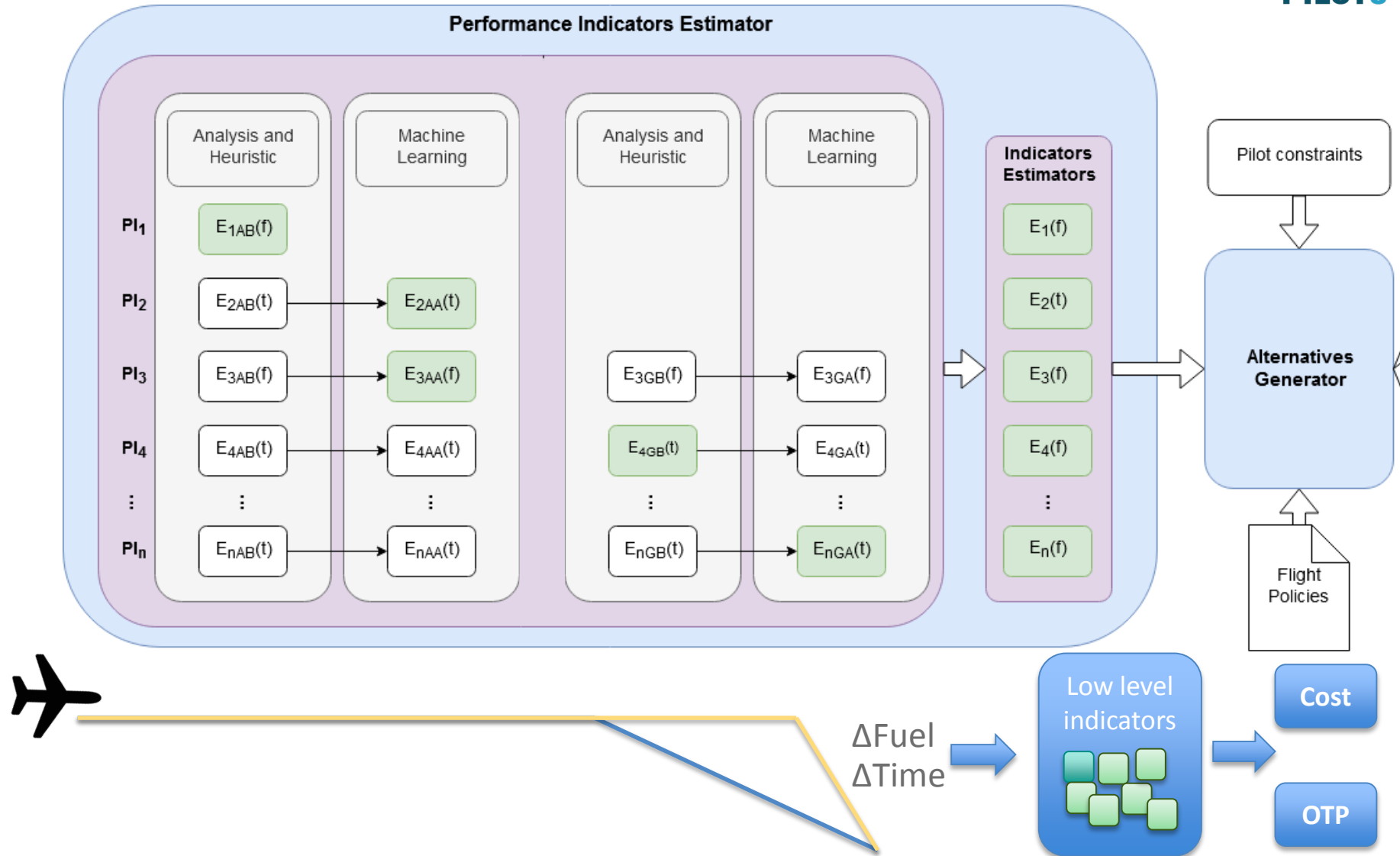
# Pilot3 KPIs considered



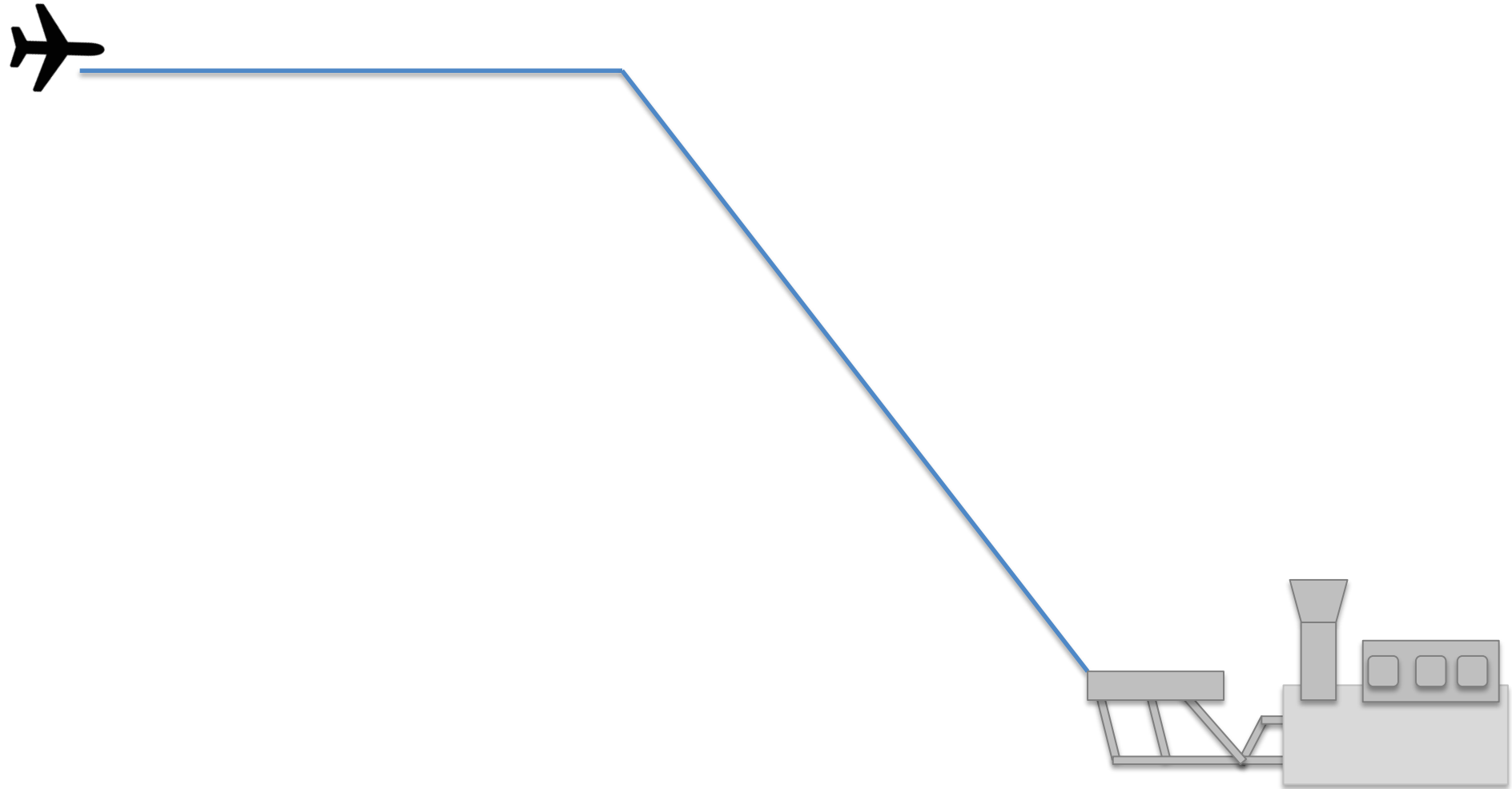
# Pilot3 Estimation of indicators



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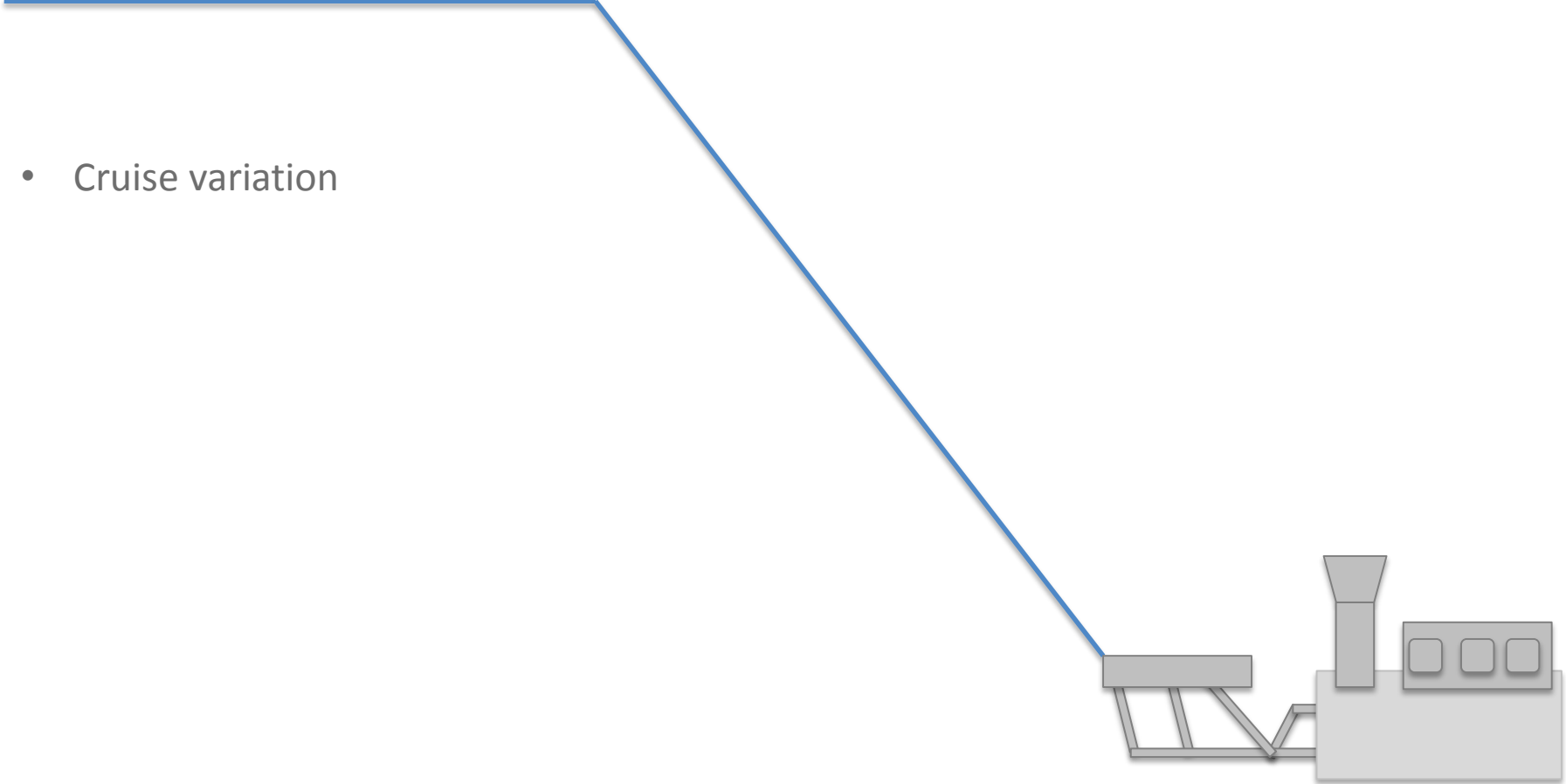
# Pilot3 Operational ATM Estimation



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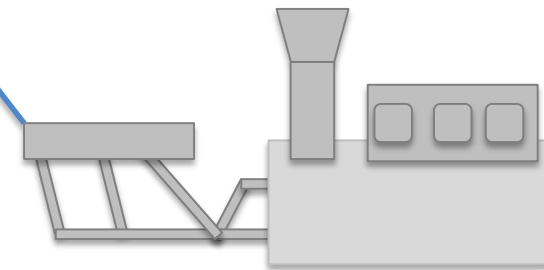
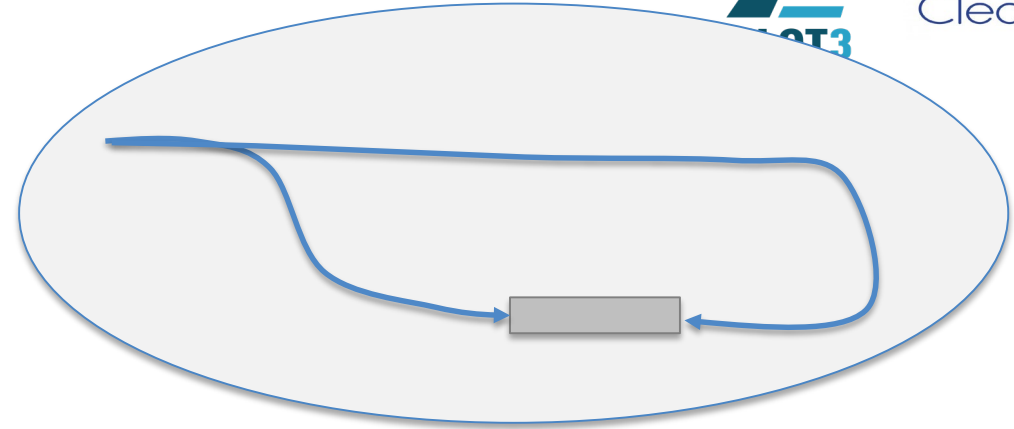
- Cruise variation



# Pilot3 Operational ATM Estimation



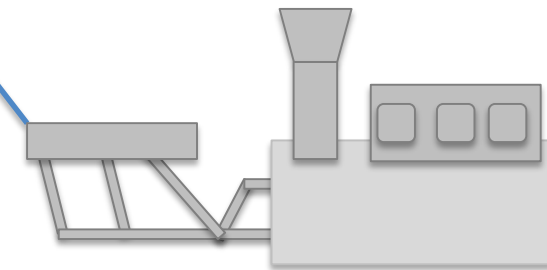
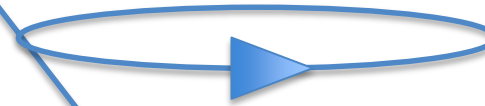
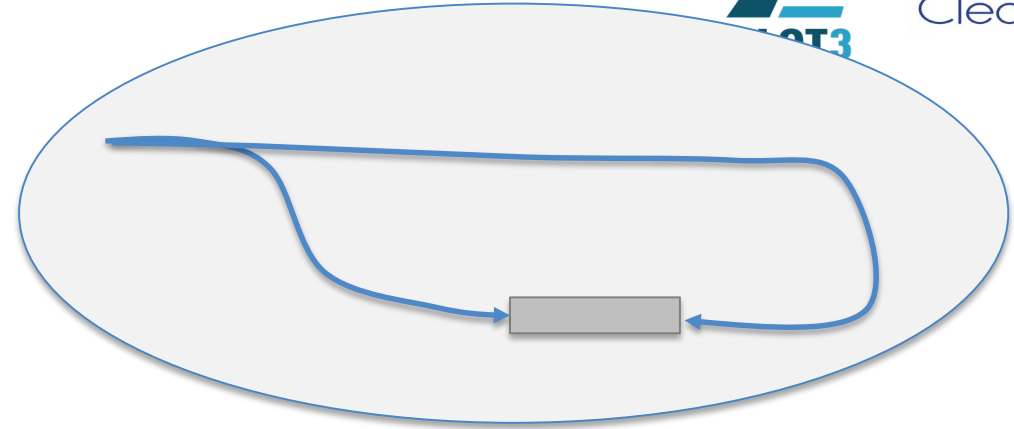
- Cruise variation
- Procedure at TMA



# Pilot3 Operational ATM Estimation



- Cruise variation
- Procedure at TMA
- Holding

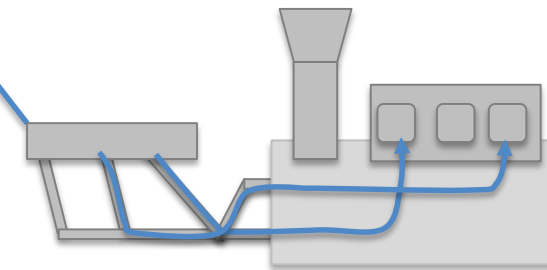
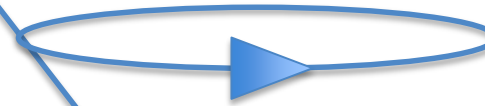
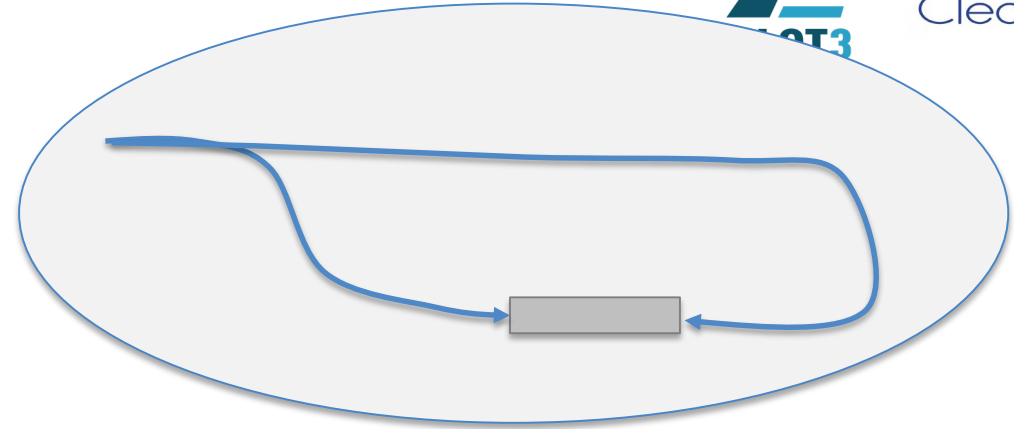




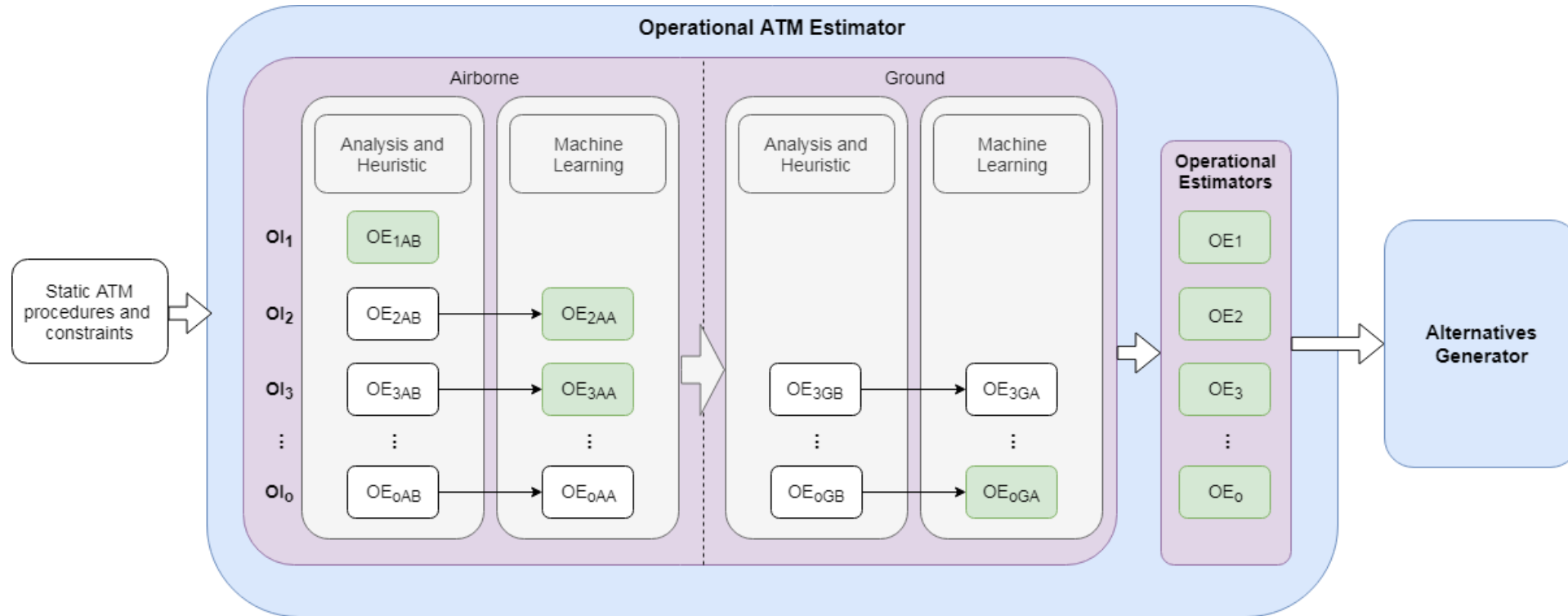
# Pilot3 Operational ATM Estimation



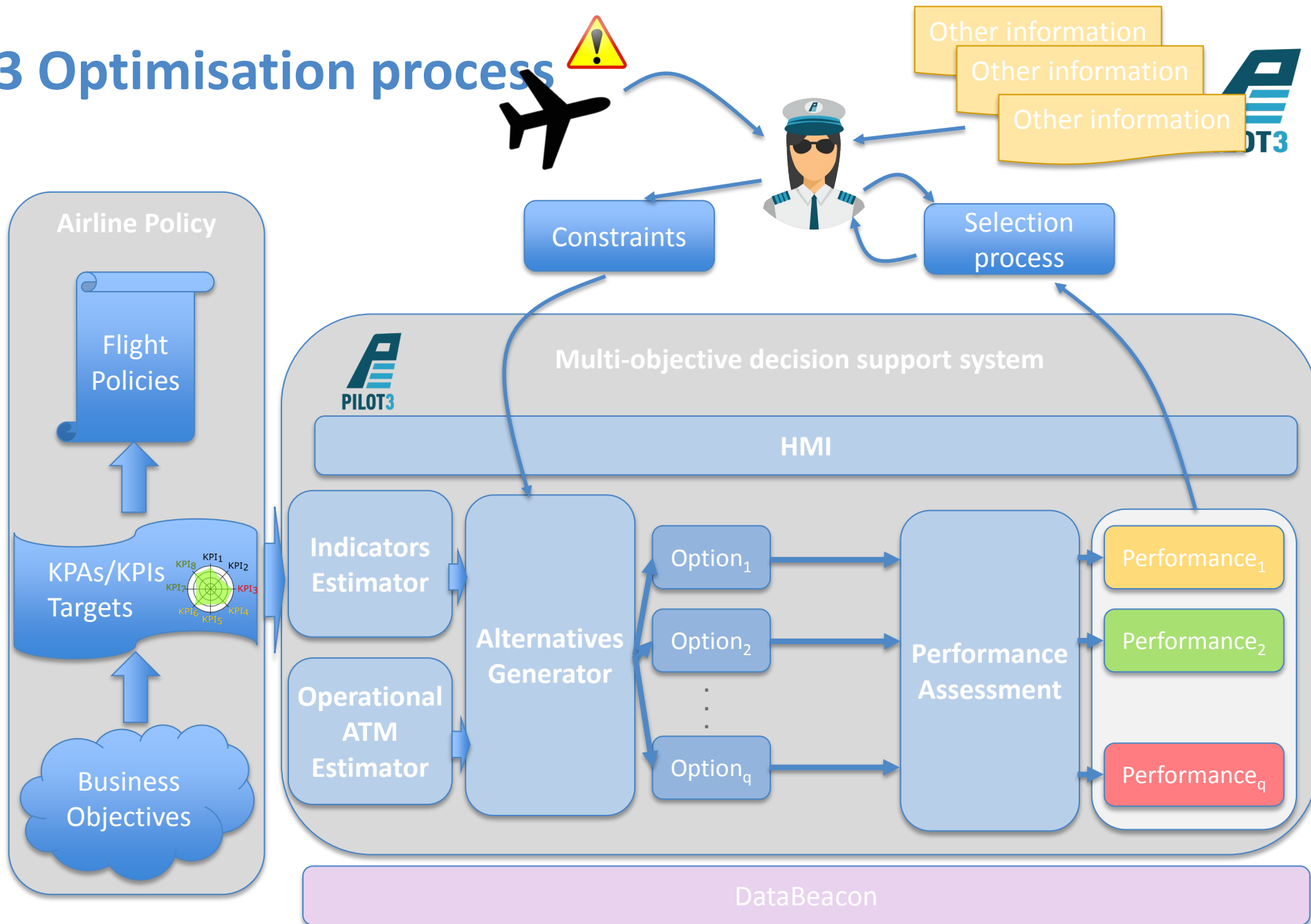
- Cruise variation
- Procedure at TMA
- Holding
- Taxi-in time



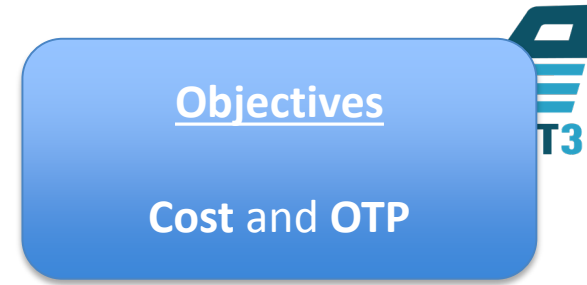
# Pilot3 Operational ATM Estimation



# Pilot3 Optimisation process



# Pilot3 Optimisation process



- If no trade off: then focus on cost
- If possible trade-off with OTP
  - optimise focusing on cost
  - optimise achieving OTP, then minimising cost  
→ provide extra cost of achieving OTP
- Possibility to consider sub-costs indicators for prioritisation of alternatives

# Conclusions



- Pilot3 is a **multi-objective decision support tool** for crew
- **Indicator estimators** with basic and advanced capabilities
- **Operational estimation** to ensure indicators relevant to crew
- Vision of **expected impact** on relevant KPIs and **trade-offs**

# A few questions about buffers...



In our models we often struggle to estimate typical buffers used (planned) by airlines, in particular during turnaround.

- Do you use 'contingency' buffers to avoid knock-on delay, due to varying delays on the day of ops?
- If you use buffers:
  - how much roughly? 5 / 10 / 15 minutes?
  - do you have a rule of thumb for different types of flights (e.g. international)?
- Apart from these buffers, is there usually some (explicit) extra time in the schedule, e.g. because a flight needs to wait for passengers from other flights?
- If so, is it typically much bigger than the 'contingency' buffer?
- Would you be interested in analytical work to adjust your buffers or is it not crucial for you? Do you use costs to trade off the actual cost of the buffer, cf. the risk of too little buffer?



## Questions?

[www.pilot3.eu](http://www.pilot3.eu)

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