

# Flightpath 2050 revisited – An analysis of the 4-hour-goal using flight schedules and origin-destination passenger demand data

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INAIR Conference, Budapest  
13th November 2019

Wissen für Morgen



# Agenda

- Introduction
- Interpretation of the Flightpath 2050 4-hour-goal
- Modelling assumptions
- Data and Methodology
- Results
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# Introduction

- Air transport's key benefit is connectivity
- Connectivity is a complex term consisting of flight destinations, flight frequency, flight time and onward connections
- Passengers enjoy travel time savings
- Out of travel time savings, economic efficiency can be improved
- The level of connectivity influences business location decisions, firm productivity and incoming tourism

⇒ Policy objective: improving connectivity

⇒ Key challenge: Finding the right indicators quantifying connectivity



# Interpretation of the Flightpath 2050 4-hour-goal

- The high level group created in 2011 strategic objectives for aviation in Europe:
  - “Meeting societal & market needs”;
  - “Maintaining and extending industrial leadership”;
  - “Protecting the environment and the energy supply”;
  - “Ensuring safety and security” and
  - “Prioritising research, testing capabilities & education”.

- Key objective in the area of societal & market needs:

**“90% of travellers within Europe are able to complete their journey, door-to-door within 4 hours”**

- 2017 ACARE SRIA aims at quantifying and monitoring the goal achievement (⇒ DATASET2050 Horizon2020 project)



# Modelling assumptions

- Modelling the 4-hour-goal requires a definition of the elements of the statement:
  - **90% of travellers within Europe**
    - Geographical Europe? EU28? IATA Definition?
    - Which distance? What kind of mode?
    - ⇒ Interpretation in this study: EU28 and at least one segment by air
  - **are able to complete their journey**
    - Theoretical option or actually chosen mode/routing?
    - There are good reasons why travellers choose mode/routing which is not the fastest
    - ⇒ Interpretation in this study: Theoretical possibility to travel < 4 hours
- Re-phrased 4-hour-goal in the course of this analysis:

**“90% of trips involving at least one flight segment and car traffic as airport access/egress mode within and between the EU-28 member states could theoretically be completed door-to-door within 4 hours”**



# Data and Methodology

- Europe has no up-to-date, freely available origin-destination passenger demand matrix on small geographical scale (e.g. NUTS-3)
  - ⇒ Insufficient knowledge on real OD passenger flows (since ETISplus, REMOVE data not freely available)
- Commercially available are airport-to-airport origin-destination demand data (Sabre Market Intelligence) and Innovata flight schedules (OD shortest travel time)
  - ⇒ Second best solution, as we do not know distribution of true origins/destinations
- As we do not know actual airport access and egress times, which would depend on the exact origin and destination of each trip, this study uses a matrix of plausible airport access and egress times
  - ⇒ Objective: sensitivities of goal achievement wrt. different access/egress times



## Results – Trip Distribution by number of stops

Distribution of origin-destination passengers in Europe by number of stops, 2018

Number of stops/transfers within the air transport system	Number of passengers in million	Passenger share
<b>Non-Stop</b>	513.78	<b>93.47%</b>
<b>One-Stop</b>	34.93	<b>6.36%</b>
<b>Two-Stop</b>	0.96	<b>0.17%</b>
<b>Three-Stop</b>	0.02	<b>0.0%</b>
<b>Total</b>	<b>549.69</b>	<b>100.0%</b>

Source: Based on Sabre MI Data 2018

- With one or more stops, 4 hours total travel time nearly impossible to achieve
- Already today, 93.5% of travellers use non-stop connections ⇒ only very limited scope to lower travel times with more non-stop connections





# Results – Calculation of „scheduled speed“

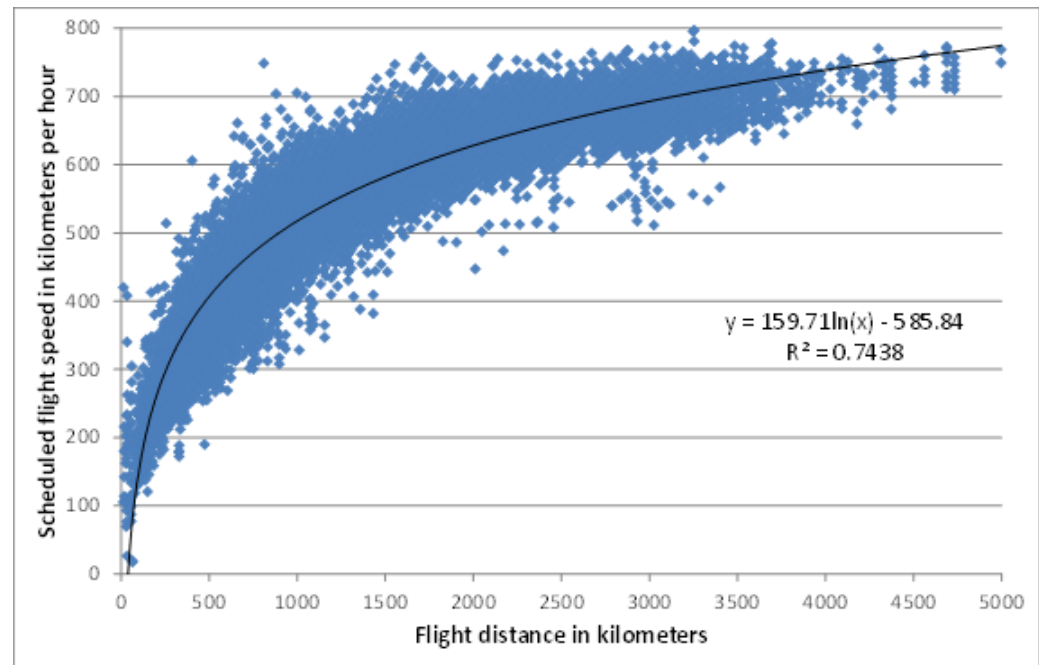
Relation between flight distance and speed for intra-European flights, 2018

Avg. scheduled speeds

517 km/h at 1000 km

628 km/h at 2000 km

693 km/h at 3000 km



Source: Based on Innovata Flight Schedules 2018

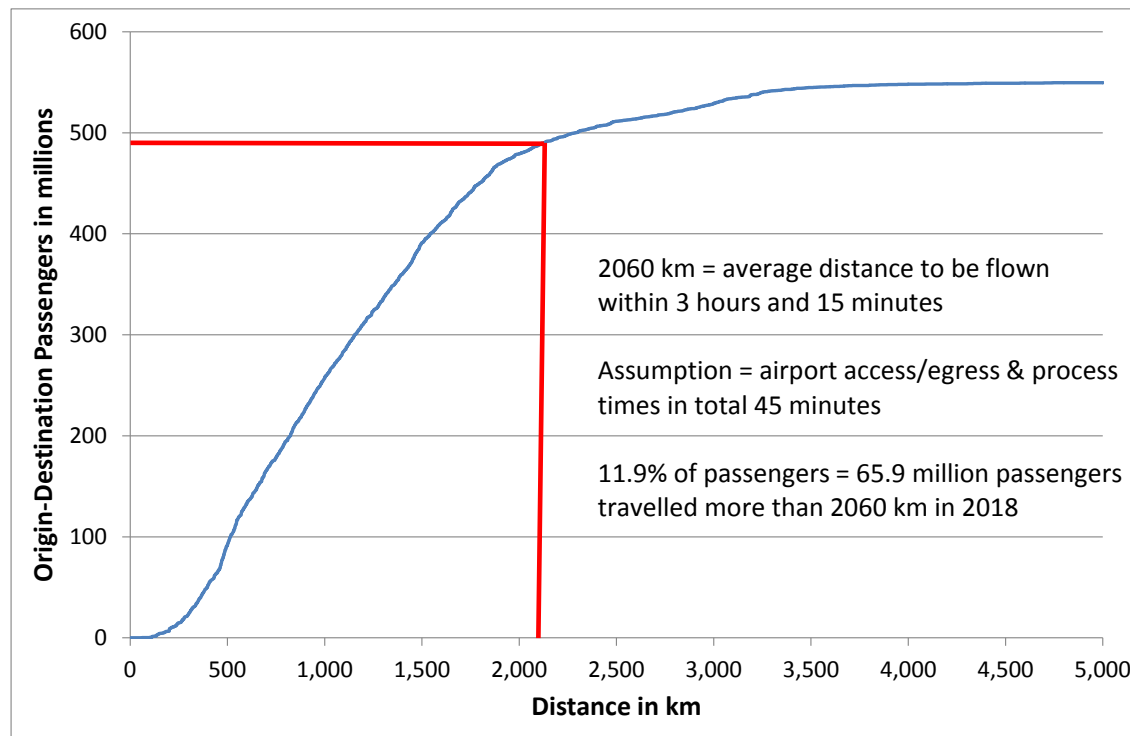
- ⇒ Assumption: 60 minutes airport access time (incl. process time) and 30 minutes airport egress time ► maximum flight time is 2.5 hours to stay within 4 hours total
- ⇒ 2.5 hours ► 1440 km maximum flight distance
- ⇒ About two thirds of OD passengers in 2018 travelled 1440 km or less





# Results - Longest possible flight distance to stay <4 hrs

Cumulative distribution of origin-destination air passengers by distance, 2018



⇒ Even if all passengers had the shortest possible airport access/egress and process times, ~12% of travellers would need for travel D2D more than 4 hours



## Results – Sensitivity Analysis

Sensitivity of the degree of achievement of the 4-hour-goal towards variations in airport access/egress times

		Airport egress & process time – minutes after scheduled arrival time			
		15 minutes	30 minutes	45 minutes	60 minutes
Airport access & process time – minutes before scheduled departure time	30 minutes	82.4%	79.0%	73.2%	64.8%
	45 minutes	79.0%	73.2%	64.8%	56.7%
	60 minutes	73.2%	64.8%	56.7%	47.9%
	75 minutes	64.8%	56.7%	47.9%	39.0%
	90 minutes	56.7%	47.9%	39.0%	28.9%
	105 minutes	47.9%	39.0%	28.9%	17.6%
	120 minutes	39.0%	28.9%	17.6%	5.9%

If we added 30 minutes airport access time (incl. process time) and 15 minutes airport egress time to real shortest flight times, only 82.4% of passengers would be able to complete their journey within 4 hours



# Conclusions and Outlook

- >93% of travelers fly non-stop on intra-EU trips
- ~12% of travelers fly on OD pairs, which are simply too long, so that the 4-hour-goal cannot be achieved, even if non-stop flights with sub-sonic jets were offered on all airport pairs
- Based on theoretically shortest flight times contained in the 2018 flight schedules and actual air passengers, only 82.4% of passengers could have travelled D2D in less than four hours – if D2D = Airport-to-Airport
- If airport access/egress/process times are assumed to be 90 minutes, this value declines to 64.8%
- Potential measures and their effectiveness:
  - More non-stop flights – very low to low
  - Higher flight speeds – medium to high (intra-EU supersonic highly unlikely)
  - Reducing buffer times in flight schedules – medium to high
  - Speeding up airport access/egress – high
  - Speeding up airport processes – high

