

# Environmental Benefits of A-CDM at Zurich Airport



## 1. Introduction

Zurich Airport ranks among the top 12 busiest airports in Europe with approximately 265,000 aircraft movements in 2014. This traffic is accommodated on three runways (figure 1) which are mostly operated in segregated mode. Approximately 257,000 flights are IFR (Instrument Flight Rules) with 15% being business jets [1].

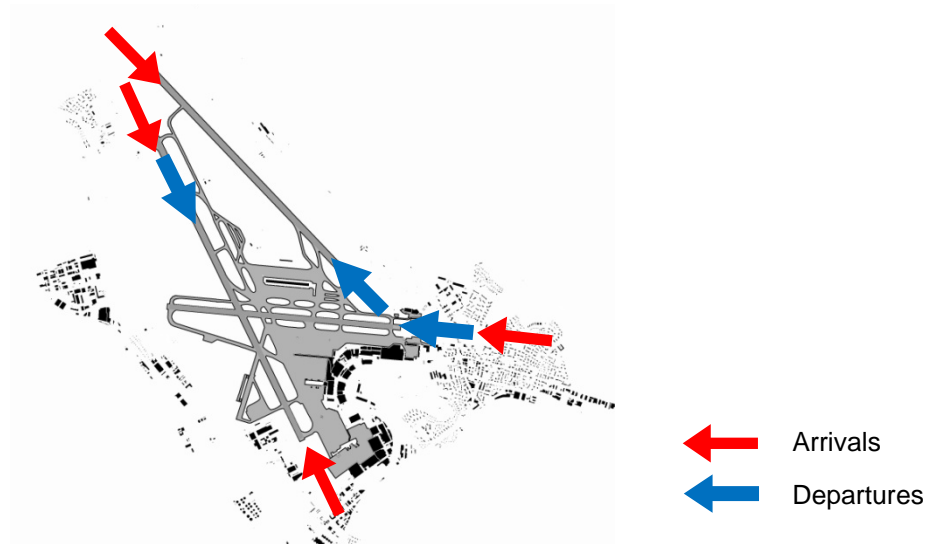


Figure 1 Zurich Airport Layout

Air navigation services are provided by the national ANSP, skyguide. However, apron control services are provided by Zurich Airport (Apron Control).

### Zurich Airport Operations 2014

Scheduled and Charter Aircraft Movements	230,684 (87% Europe, 13% Intercontinental)
General Aviation Aircraft Movements	34,286
Total IFR flights (used for A-CDM assessments)	256,974
Average daily movements	726
Total Passengers	25.43 mio
Number of Runways	3, all intersecting (10/28; 14/32; 16/34)
Number of Contact stands	64
Number of Remote stands	48

Table 1 Zurich Airport Operations

## 2. A-CDM

The Airport Collaborative Decision Making concept (A-CDM) developed by EUROCONTROL and supported by ACI and IATA has been partly implemented at Zurich Airport in May 2012. With the implementation of Collaborative Management of Flight Updates (Departure Planning Information (DPI) exchange with NMOC in August 2013 Zurich Airport became fully A-CDM Airport.

However, already in March 2003 the DARTS (Departure and Arrival Traffic Management System) has been developed and introduced at Zurich Airport. With the operational implementation of DARTS, local CDM procedures had to be agreed and established. This has led to an increase in operational efficiency by sequencing the outbound flights according the departure routes, wake turbulence separation criteria and aircraft performance. In addition a reduction of air quality impacts by reducing taxi-out times and runway holding times could be achieved.

With the implementation of the A-CDM concept at Zurich Airport the transparency and the prediction of the turnaround processes including the integration of the ATC needs could be improved. Especially the processes during adverse weather conditions were one of the big achievements. The big advantage is the direct exchange of local information to the Network Manager Operations Center (NMOC) at EUROCONTROL. Therefore the network impact of flights departing from A-CDM airports can be assessed more accurate and in return essential ATFM regulations can be allocated to the specific needs. In terms of potential environmental benefits, the most important is an average reduction of the taxi-out times of 40 seconds per flight in 2014 compared to 2012 [1]. This reduction cumulates to be approx. 1,450 hours of taxi-time (or 60.4 days).

## 3. Environmental Benefits

The environmental benefits have been quantified based on the operational benefits assessment and the airports aircraft, emission and operations database. All aircraft are considered individually in terms of aircraft and engine combination (aircraft registration/engine UID).

The quantified operational improvement for the A-CDM 2014 of 40 seconds lower taxi time per flight has then been applied uniformly to all scheduled and charter operations. The resulting emission reductions are listed in table 2, together with environmental gains achieved by the DARTS system in 2004. The cumulative fuel savings are approximately 2'300 t.

Emission Reductions	DARTS 2004	A-CDM 2014		Cumulative Benefits
			% of all taxi-emissions	
Reduction of CO <sub>2</sub>	3,620 t	3,680 t	1.4%	7,300t
Reduction of NOx	4 t	4.8 t	0.5%	8.8 t
Reduction of HC	4 t	4.4 t	3.0%	8.4 t
Reduction of CO	34 t	34.9 t	3.0%	78.9 t
Reduction of PM	na	0.1 t	1.1%	na

Table 2 Environmental Benefits

The introduction of A-CDM has demonstrated a cumulative positive effect over the years in emissions both of local and global importance at Zurich airport.

## Figures

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## Sources

No.	Document Name
[1]	Atlas Chase: Airport-CDM Benefits Factsheet Zurich (LSZH/ZRH), 2015

Version	Date	Name	Modifications
0.1	24.9.2015	Fleuti	Input OBFP
1.0	20.10.2015	Fleuti	Final

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