

Performance
through
innovation



FUTURE AND LONG TERM COMMUNICATIONS INFRASTRUCTURE PANEL AIRSPACE WORLD 2023, GENEVA

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Maastricht Upper Area Control Centre



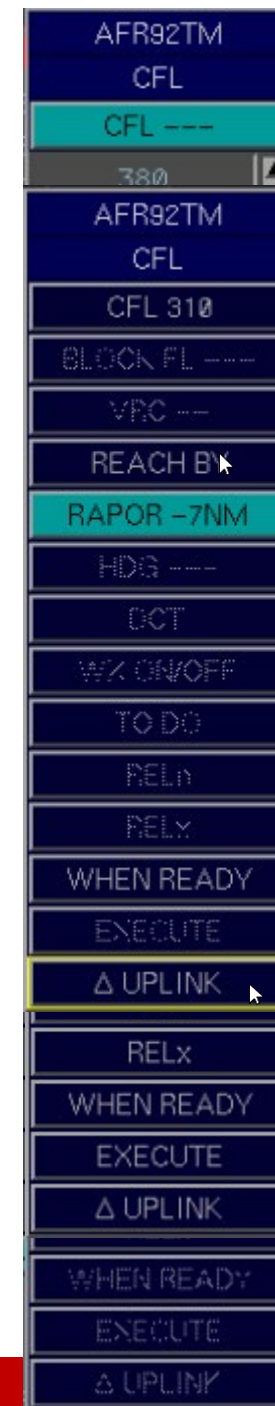
CPDLC use cases – efficiency

CPDLC clearances take considerably less time than voice clearances

- “C/S, descend FL280, REACH LEVEL BY NOGRO”
 - Via voice(including readback): ~15 seconds
 - Via CPDLC: ~2 seconds

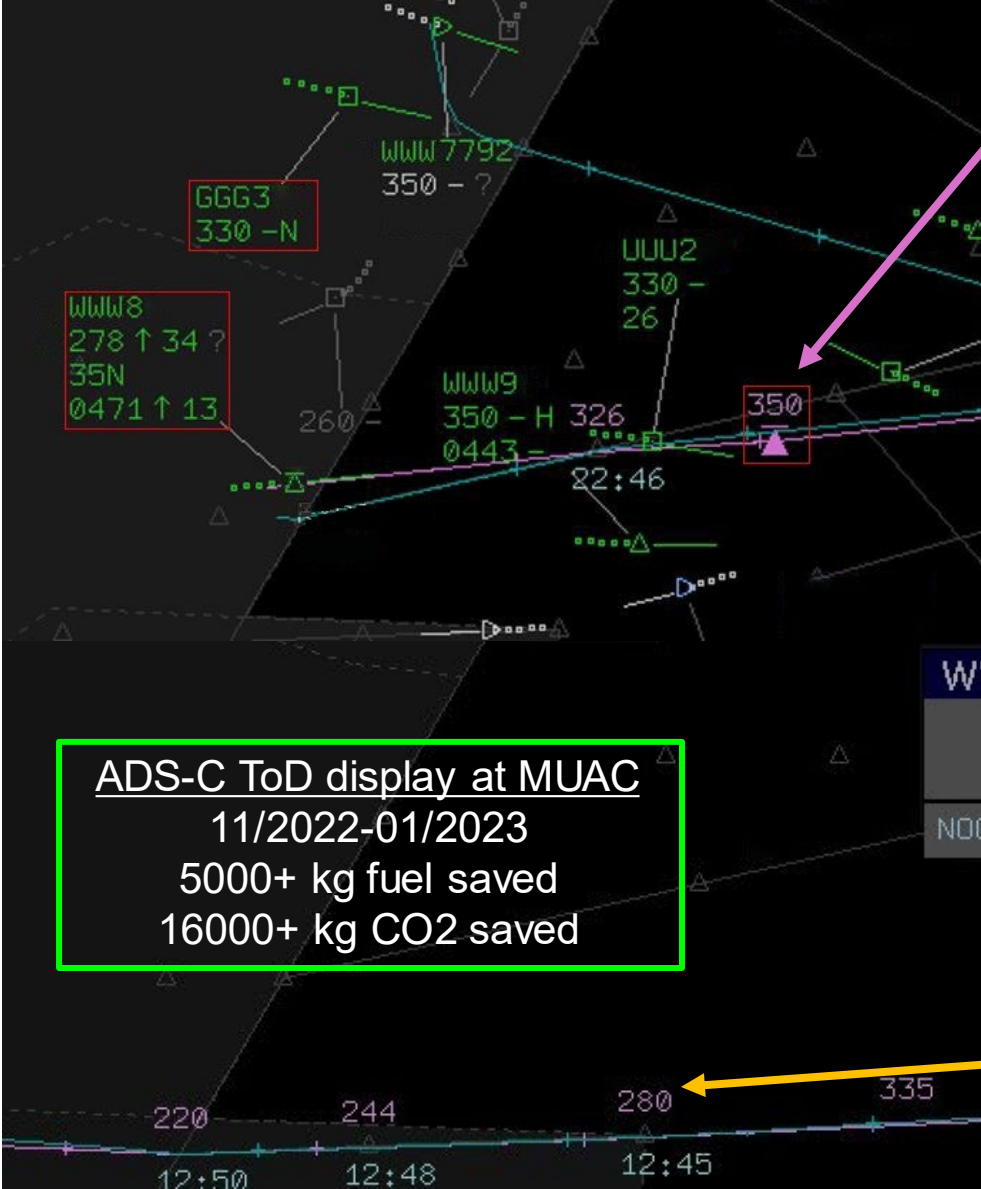
- “C/S, contact Maastricht on 132.085”
 - Via voice(including readback): ~9 seconds
 - Via CPDLC: ~1 second

- ~16.000 CPDLC messages/day at MUAC



“As an air traffic controller, time is of the essence. We need time to think about solutions of conflicts, of climbs/descents, time to talk to our neighbouring units, to our planning controller, supervisor or upper/lower sectors. Even if you don't hear a controller talking on the frequency, he might be super-busy in the background either coordinating something or thinking of solutions.” – IATA Airways magazine, 2016.

Benefits of ADS-C EPP



Top of Climb display via ADS-C EPP can help controllers estimate the aircraft's climb performance

Top of Descent display via ADS-C EPP can help controllers to provide a more optimized descent profile

ADS-C ToD display at MUAC
 11/2022-01/2023
 5000+ kg fuel saved
 16000+ kg CO2 saved

WWW6		ATFCM	FDM	EPP	COORD	CPDLC	MSG	FPL	X
A320 /M N0443 UKKK EGGW		ECL380	NOGRO	1245	280	118.480			
132.085		WWW6	F280	H267°	M0.77	IAS242	GS0421	-	
NOGRO	1245	46	280	N3574	LLU	OK	118.480		
POINTS	FL	ETA	SPEED	LAT	VERT				
5201N00402E	380	12:41:10	M.76		ToD				
5200N00339E	335	12:43:13	IAS270		xOVR				
NOGRO	280	12:45:54	IAS270	WAYPT					
LUSDR	244	12:48:57	IAS270	WAYPT					
AGE: 12:37		REFRESH							

Datalink use cases – safety



CPDLC

- **Callsign confusions (only reported if the aircraft actually deviated from their clearance): 172**
 - *AIRLINE36X read back the descent clearance for AIRLINE14X. AIRLINE_B was opposite 1000" below. Luckily the crew of the AIRLINE36X questioned the clearance before initiating the descent.*
 - *AIRLINE6B was transferred but AIRLINE6BV took the call first*
 - Instructions given via CPDLC would have helped to avoid these incidents
- **Prolonged losses of communications: 237 (interceptions: 28)**
 - CPDLC provides an additional means of contacting the crew in the event of communication issues, and it could have helped resolve some of these cases faster (CONTACT)
- **Stepping on/being stepped on during any voice transmission: countless issues every day**
 - Requests via CPDLC and using WILCO instead of read-backs could help

ADS-C

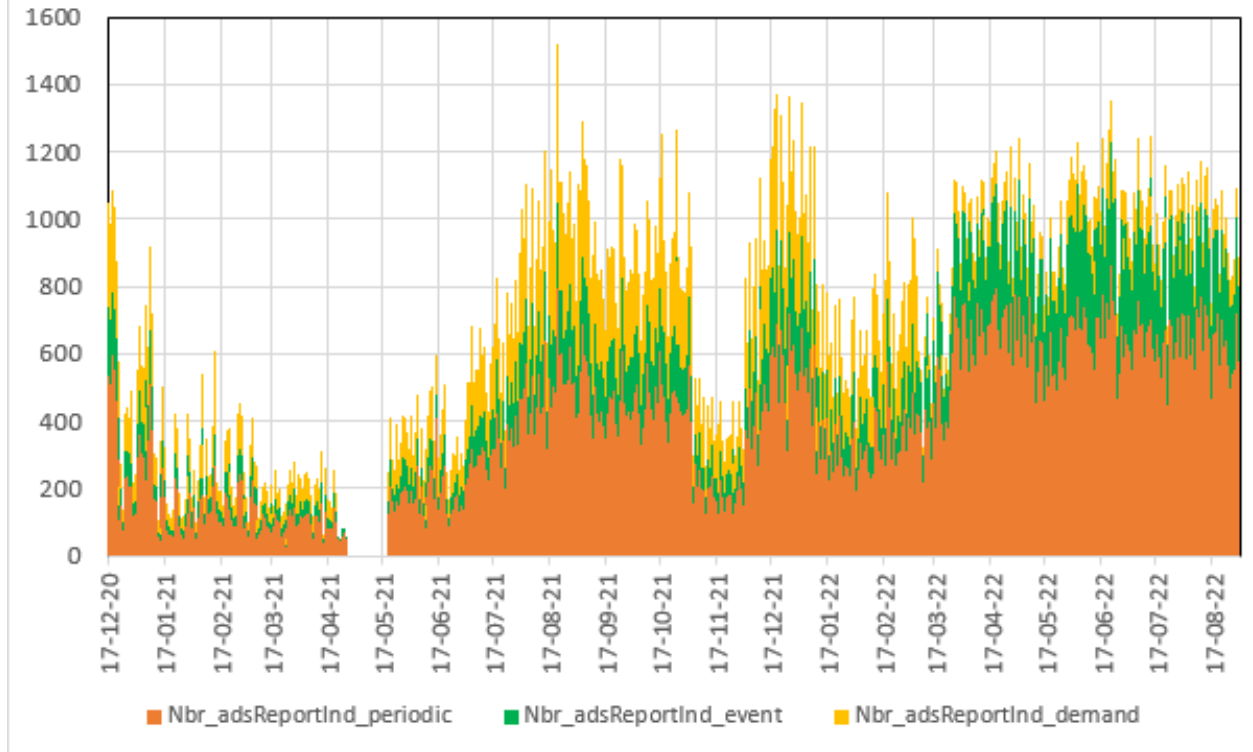
- **Wrongly entered route clearances: 8 (only in 2022)**
 - *Pilot loaded the wrong FPL in the FMS*
 - *Flight plan discrepancy between ATC and flight deck (change was not communicated to crew, potential fuel issue due to longer route)*
 - ADS-C shows wrongly implemented clearances to the controller (also if given on voice)
 - CPDLC v2 provides push-to-load functionality, which can help to avoid possible misinterpretations of certain CPDLC v1 route clearances

MUAC's overview on ATS-B2 benefits



Data usage facts

Number of ADS-C Reports per day and per type



CPDLC Logon becomes more important

ADS-C EPP Report sizes at MUAC (33.883 contracts)

Complete flight through MUAC airspace (~20-40 mins)

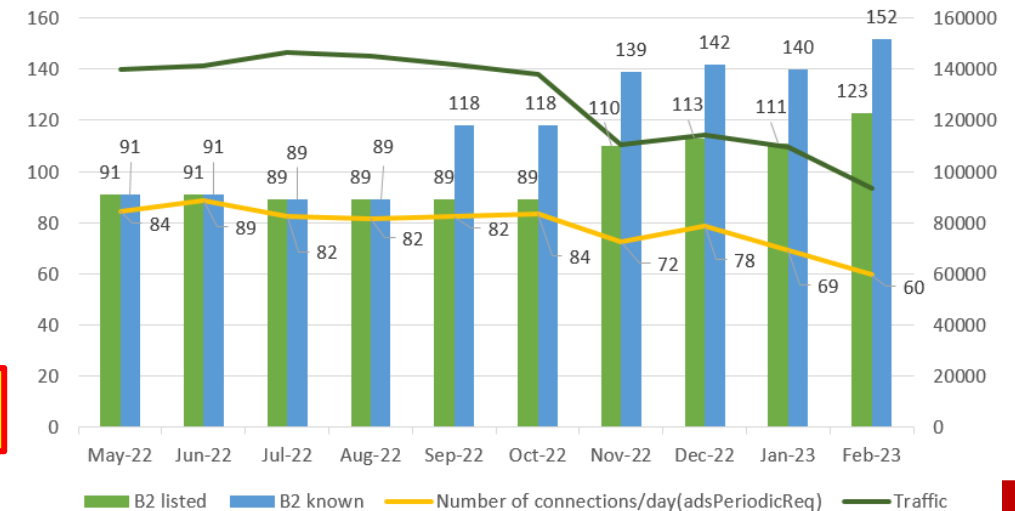
Average Periodic report size: 404 bytes

Average EPP report size (total): 637 bytes

Single report

Periodic/demand EPP report(20 points): 375 bytes

ATS B2 registered/known/connected aircraft in MUAC



Data usage facts

Taking the busiest day and time of 2022 in terms of ADS-C: at a maximum 8 ADS-C sessions were running in parallel (90 aircraft on the B2 list) → the number of maximum simultaneous sessions is estimated 10% of total equipage

ADS-C reports per flight	Total reports	Periodic reports	Event reports	Demand reports
Total	419163	240043	89927	89193
mean	13.60	7.79	2.92	2.89
std	6.53	3.91	2.02	2.71
min	0	0	0	0
25%	10	6	1	1
50%	14	8	3	2
75%	28	10	4	5
max	246	230	17	21

Note: the item represented in “max” of 230 periodic reports was a test flight