



# Data link Network Operational Status Report

March 2023 – Developed 17/04/2023

This report is the monthly 'Data link Network Operational Status Report' as identified in the DPMF Report Catalogue available from the [DPMF OneSky team web site](#). It provides a summary of the operational status and technical performance of data link in Europe covering a rolling 12 month period for monthly statistics ending in March 2023.

The report covers three main areas of the datalink operations in Europe:

1. Operational Status
2. Technical Performance
3. VDL Mode 2 Performance

For each of the three areas above different metrics are presented. A detailed definition of the metrics used in this report is available in the DPMF Report Catalogue. In this report, the identifier for each metric used in the DPMF Report Catalogue is shown in angled brackets e.g. <N-1>.

## Notes:

- When ANSPs are providing new LISAT logs to DPMF, the metrics are updated accordingly (retroactively, when data for previous periods are provided). Therefore, some values presented in this report might evolve from past reports.
- As from January 2023, this report includes data from EETT (Estonia). However, for the month of March, the data is missing.
- As from December 2022, this report includes data from EISN (Ireland).
- As from November 2022, this report includes data from LPPC (Portugal).
- As from April 2022 this report includes data from EYVC (Lithuania).
- As from March 2022 this report includes data from LIBB, LIMM, LIPP, LIRR (Italy).
- As from March 2022 this report includes data from LHCC (Hungary).
- This report assess the technical performance of data link above the level from which each ATSU provides the data link service, using a single level for each Centre as described in [https://ext.eurocontrol.int/WikiLink/index.php/Implementation\\_Status\\_Table](https://ext.eurocontrol.int/WikiLink/index.php/Implementation_Status_Table)

## 1. Operational Status

Figure 1-1 on the following page provides a status for each FIR/UIR covered by the DLS IR with a status as of the end of the reporting month. The top map shows the operational status of each centre (<N-4>). The map below shows which centres are providing LISAT data to NM. The table on the right shows per centre for the reporting month: i) the number of flights operating above FL285, ii) The Provider Abort rate (only for those centres providing LISAT data to NM), iii) what percentage of flights indicate that they are capable of performing CPDLC over the ATN (i.e. file 'J1') and iv) what percentage of the flights operating above FL285 are actually seen using CPDLC over the ATN (based on the available LISAT data).

### ANSPs with service limitations and operational restrictions

The table below identifies the current service limitations and operational restrictions. There are no changes in this table compared to previous reports.

Centre	Datalink service operational restrictions
France (LFFF, LFRR)	All datalink services are provided but flight crew clearance requests are not supported and a systematic controller response "Unable" is uplinked.
Germany (EDUU)	Airspace control in the south-eastern part of Germany below FL315 is delegated to Munich ACC (EDMM). In this airspace, datalink services are available only after prior coordination (i.e., when EDUU agrees to take or maintain control of flight). <u>Datalink services are provided only to Logon-List a/c</u>
MUAC (EDYY)	Datalink services are provided only to Logon-List a/c
Switzerland (LSAG, LSAZ)	Datalink services are provided only to Logon-List a/c

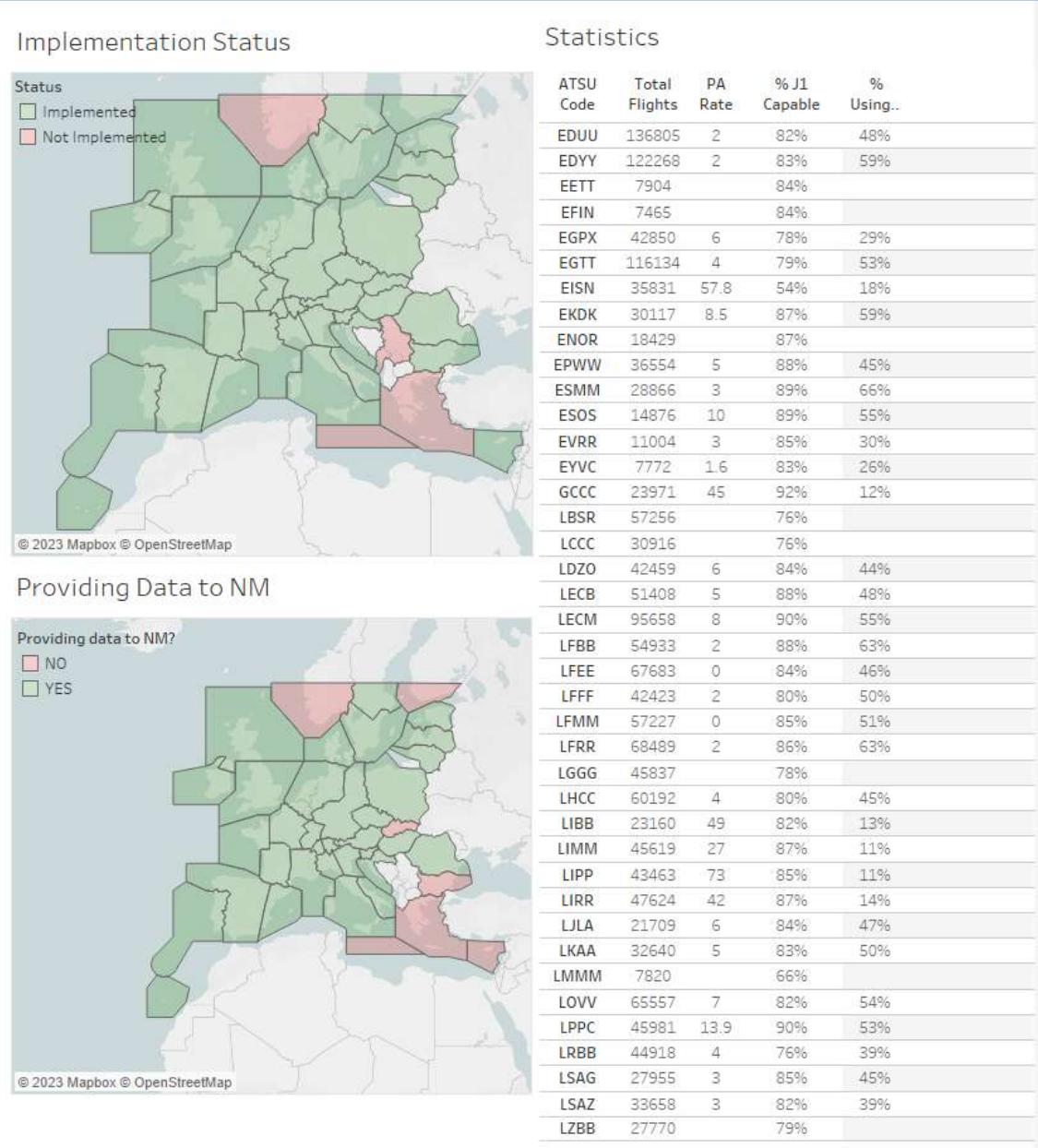


Figure 1-1: Current operational status of data link over the ATN

## CPDLC / ATN Flights

Figure 1-2 presents data only for flights operating above FL285 in the DLS airspace. It shows what percentage of flights in that airspace<sup>1</sup> file 'J1' in their flight plan <N-1> and what percentage indicate in the flight plan that the aircraft is exempt. For this month, 82.2% of flights indicated the capability to perform CPDLC over ATN/VDL Mode 2. 14.3% (shown in red) indicate they are exempt. Considering the known exemptions, NM estimates that about 1.2% of the filed FPLs are likely contravening the DLS IR (shown in green).

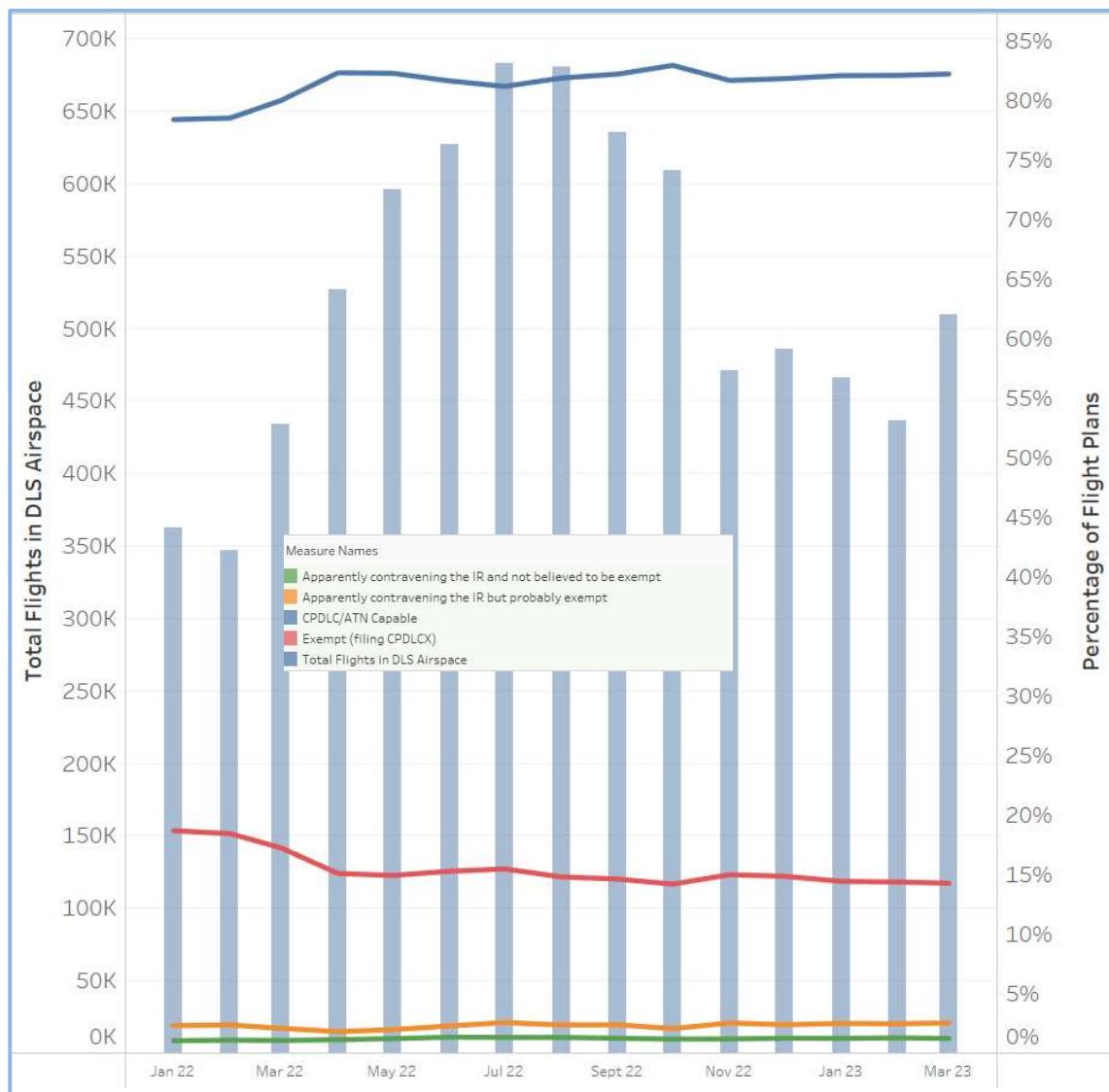


Figure 1-2: Proportion of flights capable of using CPDLC over ATN/ VDL Mode 2

<sup>1</sup> EHAAFIR, LOVVFIR, LECBUIR, LIBUIR, EBURUIR, GCCCUIRN, GCCCUIRS, LFFFUIR, EDVVUIR, LPPCFIR, EGTTUIR, LECMUIR, LIMMUIR, EDUUUIR, LIRRUIR, EGXPUIR, EISNUIR, LZBBFIR, LRBBFIR, LHCCFIR, EKDKFIR, LJLAFIR, LCCCFIR, LKAAFIR, LBSRFIR, EPWWFIR, EFINFIR, LGGGUIR, LMMMUIR, EVRRUIR, ESAUAR, EETTUIR, EYVLUIR.

## 2. Technical Performance

### Overall Monthly Provider Abort Rate

Figure 2-1 below shows the monthly PA rate <0-23> aggregated for all ANSPs providing LISAT data to NM. The target value is 1 PA per 100 hours CPDLC (shown as a dashed line on the graph below). The overall average rate for the month was 5.1 PAs per 100 hours.

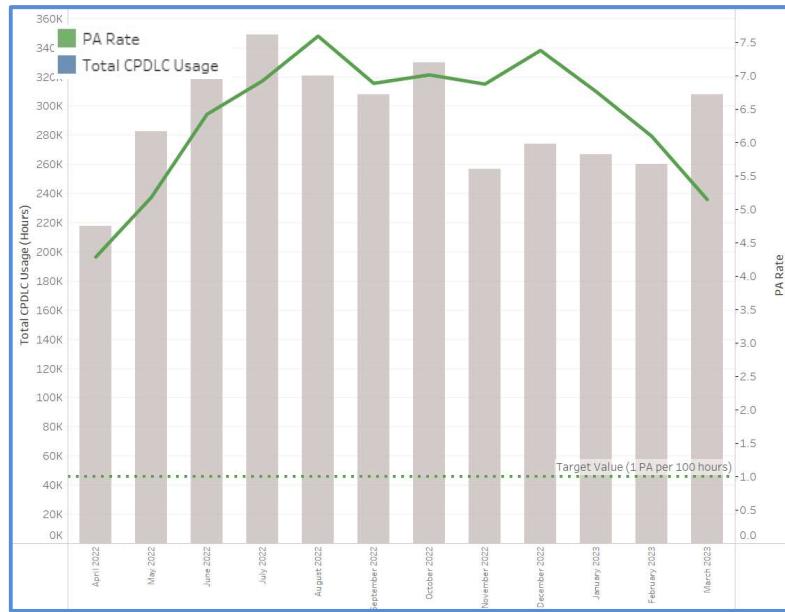


Figure 2-1: PA rate

Figure 2-2 below shows the monthly PA rate of aircraft on the [Logon List](#) against aircraft not on the Logon List, using only data from centers that do not support the Logon List<sup>2</sup>.



Figure 2-2: Logon Listed Aircraft PA rate

## Monthly PA rate per Centre

The PA rate for each of the centers providing data to NM is shown in the table in Figure 2-3 below for the last 12 month period for the months LISAT data are available.

Atsu Code	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023
EDUU	2,1	2,5	2,6	2,5	2,0	2,4	1,9	1,4	1,6	1,1	1,5	2,0
EDYY	2,9	3,5	3,7	3,0	2,7	3,2	2,8	2,4	2,7	1,9	2,1	2,1
EETT										2,5	0,8	
EGPX	6,5	6,0	6,3	5,7	7,0	7,1	6,0	5,5	5,8	4,9	5,1	5,7
EGTT	3,7	3,8	3,7	4,0	4,1	4,9	3,7	3,4	4,3	3,6	3,7	3,8
EISN								41,2	55,2	51,8	56,8	
EKDK	9,1	9,2	7,0	6,3	6,6	6,6	7,8	7,3	7,7	8,4	8,6	9,7
EPWW	2,2	2,6	4,8	3,6	2,6	3,1	2,7	3,6	3,3	5,7	3,2	4,0
ESMM	2,0	2,9	3,3	2,8	2,4	2,2	2,8	2,5	2,7	2,3	2,8	3,1
ESOS	4,5	6,5	4,5	3,8	4,1	5,9	8,9	4,9	5,2	3,6	4,2	4,5
EVRR	3,9	2,9	3,6	2,8	4,5	3,3	3,5	3,5	5,3	3,2	3,0	3,2
EYVC	2,6	2,9	1,9	3,4	1,8	2,8	2,2	3,3	2,3	2,4	1,5	1,6
GCCC	41,9	40,8	49,1	45,1	47,6	44,0	18,2	40,3	44,9	48,1	49,0	46,7
LDZO	8,1	9,1	11,8	19,3	12,2	11,4	10,6	7,3	6,5	5,2	5,3	5,7
LECB	4,0	4,8	4,5	4,9	7,8	10,7	3,8	3,5	2,6	2,7	2,8	2,7
LECM	4,7	4,6	4,9	4,9	5,3	5,4	4,8	7,3	6,5	4,9	6,6	5,9
LFBB	1,3	1,3	1,4	1,6	2,8	3,7	1,4	1,5	1,9	1,2	1,3	1,5
LFEE	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LFFF	3,0	5,0	3,5	2,9	4,2	4,3	4,7	4,5	4,7	4,2	4,4	4,0
LFMM	4,0	7,4	8,3	13,1	10,3	7,5	7,1	6,3	1,0	0,0	0,0	0,0
LFRR		1,6	1,5	1,4	1,7	1,4	1,6	1,7	1,9	1,9	1,8	2,0
LHCC	5,2	5,9	4,8	4,9	4,0	4,2	3,2	3,7	3,8	4,6	4,0	4,2
LIBB	23,3	43,9	82,1	143,1	167,5	156,3	122,3	76,9	74,1	65,1	49,2	31,6
LIMM	15,9	43,9	86,8	158,4	216,9	181,3	319,8	204,1	237,0	234,8	105,8	18,1
LIPP	17,3	61,6	155,7	95,3	425,6	357,4	518,8	311,4	429,0	442,1	270,1	76,6
LIRR	14,6	24,8	53,2	152,0	61,2	52,3	66,0	51,3		56,4	29,5	29,1
LJLA	5,8	6,6	7,7	7,6	8,6	7,9	9,8	4,2	5,2	5,2	5,1	5,4
LKAA	5,8	5,7	5,9	5,2	4,2	3,8	4,1	4,2	4,4	5,0	4,6	5,4
LOVV	5,3	6,1	6,1	7,0	6,1	5,3	5,2	4,3	4,2	4,3	4,5	6,7
LPPC						25,1	33,8	50,6	31,9	24,7	16,8	
LRBB	2,7	3,1	3,7	4,1	3,9	4,5	3,1	3,7	3,4	3,5	3,8	3,6
LSAG	2,8	4,6	6,1	16,2	5,0	4,6	4,4	4,7	2,3	3,4	3,2	3,2
LSAZ	2,6	3,1	5,8	15,5	4,2	4,1	4,5	3,2	2,8	2,1	2,2	2,6

Figure 2-3: Monthly PA Rate per Centre

## PA Rate for Major Aircraft Operators

Figure 2-4 below shows the PA rate for the top 30 aircraft operators in terms of usage of CPDLC/ATN over the month. The column “Total CPDLC” displays the total CPDLC session duration in hours while the column “Total Flights” displays the total amount of flights performed during the month.

Aircraft Operator (from FL)	Total CPDLC Usage	Total Flights	PA Rate Top30 AOs
RYR	53320,76	43.515	4,7
EZY	18216,30	15.322	3,1
WZZ	17495,60	14.060	3,9
BAW	11828,36	9.625	6,3
DLH	11674,71	12.722	2,8
EJU	10591,30	11.896	5,0
THY	10078,85	6.705	4,7
EXS	9613,79	4.957	5,9
TAP	8080,80	7.056	11,7
EWG	8052,33	7.043	3,1
SAS	8022,77	7.787	3,6
AFR	7917,92	9.879	4,3
VLG	7299,62	9.018	3,8
FIN	5219,84	2.920	5,1
KLM	5209,96	5.859	3,8
PGT	4947,97	3.156	1,8
NOZ	4187,16	2.821	3,1
NSZ	4001,88	2.551	2,8
SWR	3998,28	4.535	4,5
TRA	3691,43	2.532	1,8
AUA	3670,54	4.264	2,7
IBE	3589,74	3.867	2,7
EIN	3454,74	3.632	3,4
TOM	3247,86	1.961	5,7
EZS	3003,36	3.401	3,6
QTR	2988,28	1.897	5,3
BEL	2965,41	3.413	2,1
TVF	2045,00	1.837	2,3
IBS	1620,45	2.022	3,8
LOT	1581,07	2.005	8,3

Figure 2-4: PA Rate for the top 30 Aircraft Operators (CPDLC/ATN use)

## Monthly PA Rate for various avionics configurations

The figure below shows the monthly PA rate for various avionics configurations for aircraft on the logon list based on the information declared by the airline operators.

				Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23		
Vdr Make	Vdr Model	Cmu Make	Cmu Model															
Garmin	GDR66	Garmin	GIAG4E	3.03	9.01	9.94	13.45	17.18	14.44	15.77	8.58	6.03	6.94	3.32	2.76	8.25		
			GIAG3W	6.04	8.36	11.61	12.19	18.89	14.65	12.27	8.57	7.22	9.58	7.64	8.83	9.58		
Honeywell	EPIC VDR	Honeywell	EPIC CMF	6.95	6.67	10.58	11.45	12.27	11.04	9.38	7.23	4.91	4.47	4.88	5.18	4.79		
	KTR2280A	Honeywell	EPIC CMF	6.21	3.80	7.07	6.82	6.69	12.76	10.49	5.39	10.75	5.10	4.74	7.79	1.80		
	RTA44D	Airbus	FANS-B+	2.37	3.20	4.49	6.36	7.95	8.16	7.25	8.14	5.27	6.17	5.25	4.10	3.27		
		Honeywell	Mk2+	2.52	2.65	1.76	2.58	2.82	1.65	1.65	1.46	2.67	5.03	3.10	3.25	2.33		
	Rockwell Collins	CMU900		3.80	5.34	6.46	9.08	13.12	7.39	7.10	3.39	4.75	5.67	4.04	3.59	4.72		
	RTA50D	Airbus	FANS-C	2.87	2.74	5.59	6.05	7.45	7.67	6.50	7.04	7.49	8.85	7.18	5.69	5.03		
			FANS-B+	2.62	3.06	4.33	6.51	7.63	8.78	6.69	7.68	6.09	6.66	5.54	4.59	3.67		
			FANS-A+B							2.14	0.83	0.00	5.37	3.36		9.38		
	Honeywell	Mk2+		3.99	4.50	4.57	4.61	4.95	4.73	5.29	6.00	6.24	6.29	6.02	5.98	4.87		
		777 AIMS2		56.06	40.11	38.44	35.18	32.04	16.89	31.69	17.71	23.65	18.62	30.52	65.61	44.03		
	Rockwell Collins	CMU900		4.68	2.24	8.48	9.24	30.76	3.94									
Rockwell Collins	920	Airbus	FANS-B+	3.20	3.36	5.36	9.44	9.07	11.51	8.84	8.29	6.78	7.98	7.82	7.19	5.26		
		Honeywell	Mk2+	3.82	0.95	2.91	4.57	3.73	9.84	10.41	9.69	5.83	6.48	9.30	7.97	1.16		
		Rockwell Collins	CMU900	7.27	4.41	5.70	11.72	11.10	7.28	7.53	16.07	3.13	4.20	7.34	7.47	5.02		
	2100	Airbus	FANS-C	2.18	5.25	4.19	3.77	6.29	2.40	2.46	3.11	4.79	7.89	5.55	4.93	4.92		
			FANS-B+	2.27	2.81	4.79	6.59	7.26	9.60	7.54	8.01	6.34	6.21	5.47	4.36	2.88		
			FANS-A+B	3.93	3.61	6.14	6.93	5.82	7.46	6.95	6.10	6.36	5.08	4.32	4.60	4.13		
	Honeywell	Mk2+		1.83	2.79	1.87	2.25	2.83	1.57	1.48	1.26	1.91	2.20	2.26	2.07	1.76		
			787 CMF	4.33	5.13	5.34	5.67	5.89	5.44	5.83	4.52	5.03	6.09	9.50	9.48	10.06		
		Rockwell Collins	CMU900	3.16	4.39	3.93	4.02	4.04	3.82	4.05	3.93	7.10	8.44	7.20	5.67	4.83		
	2200	Airbus	FANS-C	2.38	2.81	3.43	4.51	4.29	5.64	5.74	6.54	12.75	16.58	14.33	10.01	7.71		
			FANS-B+	3.11	3.87	4.55	6.01	5.32	10.19	9.23	7.70	5.98	7.49	5.43	4.84	3.24		
			FANS-A+B	3.34	2.84	3.75	3.60	3.92	4.72	5.25	3.99	4.22	5.07	5.09	4.97	3.86		
	4000	Rockwell Collins	RIU-4010	10.27	6.82	11.31	10.61	12.73	9.67	10.67	10.67	10.73	10.70	9.18	10.72	10.64		
			RIU-4000	9.02	15.82	7.79	12.02	13.72	14.83	7.08	11.03	9.64	5.54	6.13	7.02	8.20		
			CMU900	10.84	8.12	10.50	9.13	10.45	10.57	10.38	8.54	8.00	5.65	7.61	2.90	5.69		
			CMU4000	2.74	4.95	5.28	6.49	10.26	5.62	5.23	6.25	3.93	3.50	4.27	3.47	4.28		
Spectralux	Dlink+	Spectralux	Dlink+			9.58	11.77	9.80	9.05	11.13	11.45	12.42	17.52	19.56	20.97	18.08	15.41	
Thales	EVRF750	Airbus	FANS-B+			3.87	4.64	7.23	10.59	8.37	10.02	9.79	9.17	6.80	7.50	6.65	6.47	5.23
			FANS-A+B													3.50		
UASC	UL801	UASC	UL801			7.02												
																14.35		

Figure 2-5: Monthly PA rate for various avionics configurations for aircraft on the logon list.

**Note:** A sample size of at least 250 hours of CPDLC use has been considered for recommendations/decisions for the Logon List aircraft. In the table above, PA rates computed from less than 250 hours of CPDLC session are displayed in grey.

## Overall Technical Round Trip Delay

Figure 2-6 below shows the 95<sup>th</sup> and 99<sup>th</sup> percentiles of the technical round trip delay <0-2> and <0-3>. It represents the delay between the time when a message is uplinked and the time when the ground system receives the corresponding application level acknowledgement (aggregated for all systems providing data to LISAT). As agreed during DPMG8 (May 2020), the TRTD is now computed taking into account downlinked ERROR messages (DM62). This has resulted in an increase of the 99<sup>th</sup> percentile value.

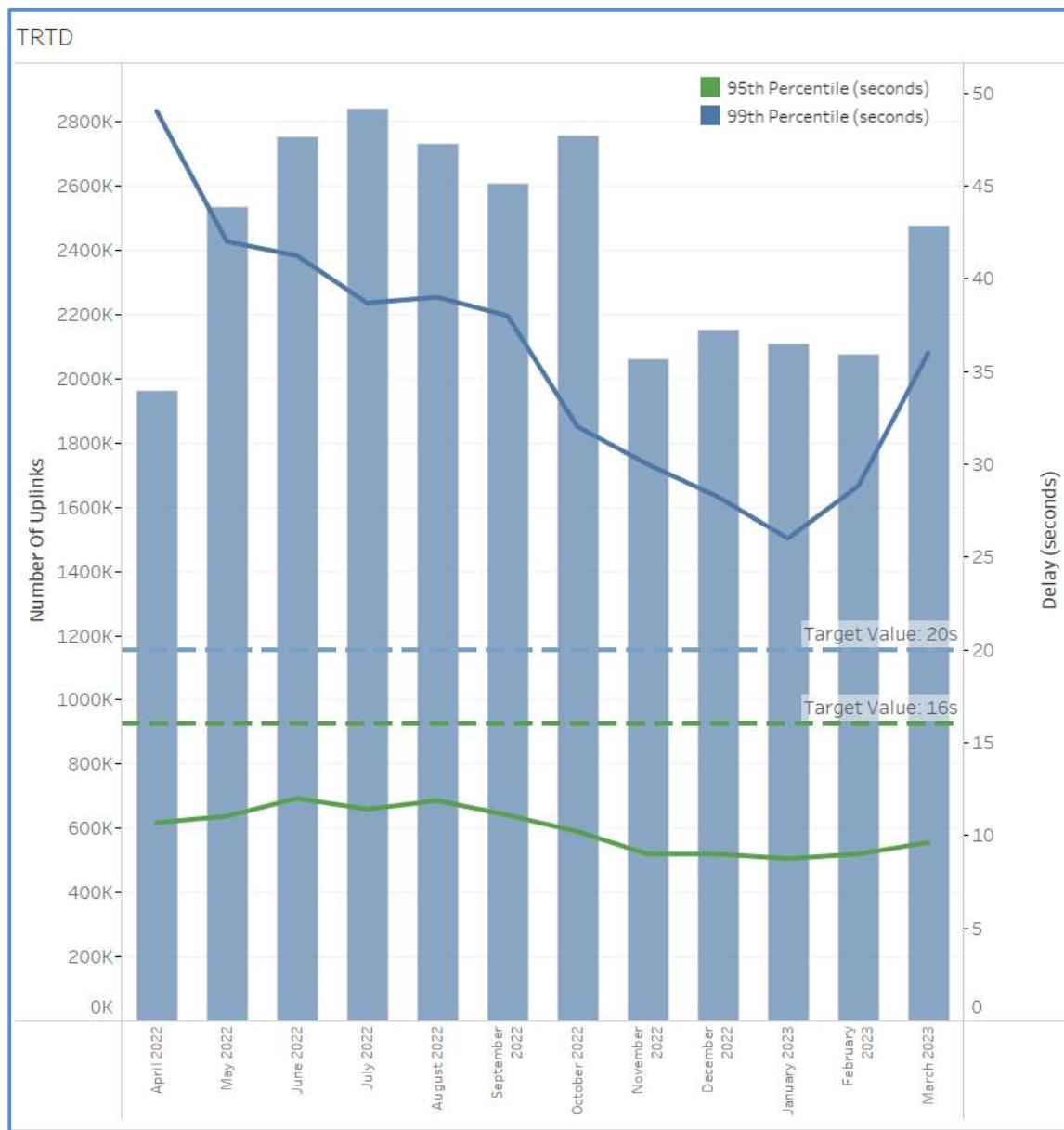


Figure 2-6: Technical Round Trip Delay

## Monthly 95<sup>th</sup> percentile of TRTD per Centre

TRTD 95th												
Atsu Code	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023
EDUU	9,5	10,5	11,2	11,3	11,1	10,8	10,2	8,3	8,4	8,1	8,4	9,6
EDYY	9,2	9,9	10,3	10,2	10,1	10,2	9,9	8,2	8,3	7,9	8,3	8,8
EETT										6,0	6,0	
EGPX	9,0	9,7	10,0	10,0	9,8	10,0	9,1	7,9	8,1	7,7	8,0	8,2
EGTT	9,3	9,8	9,8	9,7	9,6	9,9	9,4	8,1	8,2	7,9	8,5	8,7
EISN								38,0	19,6	20,7	18,2	
EKDK	9,0	9,0	10,0	10,0	10,0	10,0	10,0	9,0	9,0	9,0	8,0	9,0
EPWW	6,2	6,4	6,8	6,8	6,8	7,2	6,7	6,6	6,4	6,6	6,4	6,5
ESMM	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
ESOS	6,0	6,0	7,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
EVRR	9,0	10,0	9,0	9,0	9,0	8,0	8,0	7,0	7,0	7,0	7,0	7,0
EYVC	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0
GCCC	10,5	38,5	37,6	22,8	31,1	22,4	7,9	12,2	14,2	14,2	11,6	11,6
LDZO	11,0	13,0	13,0	13,0	14,0	14,0	12,0	11,0	10,0	10,0	10,0	11,0
LECB	8,7	8,5	9,2	9,4	9,5	9,2	8,3	7,8	7,7	7,8	8,1	8,0
LECM	8,1	7,8	8,4	8,3	8,4	8,2	8,2	8,8	8,5	8,5	9,0	8,6
LFBB	8,0	9,0	8,0	8,0	8,0	8,0	7,0	7,0	7,0	6,0	7,0	7,0
LFEE	8,0	9,0	10,0	10,0	10,0	10,0	9,0	8,0	8,0	8,0	8,0	8,0
LFFF	12,0	13,0	14,0	15,0	15,0	15,0	14,0	12,0	12,0	11,0	11,0	12,0
LFMM	10,0	11,0	10,0	11,0	11,0	10,0	9,0	8,0	6,0	6,0	6,0	6,0
LFRR		9,0	9,0	9,0	9,0	9,0	8,0	7,0	8,0	7,0	8,0	8,0
LHCC	9,0	9,0	10,0	10,0	11,0	10,0	9,0	8,0	9,0	9,0	8,0	9,0
LIBB	16,2	18,0	24,4	17,9	24,6	29,8	23,7	14,9	14,0	13,6	13,6	14,3
LIMM	48,8	70,6	78,7	87,6	79,6	54,6	73,5	41,6	37,6	29,8	37,7	82,5
LIPP	42,5	69,6	83,9	85,4	67,5	49,7	59,0	40,9	37,7	36,8	84,9	86,5
LIRR	37,8	29,9	37,5	39,5	45,7	37,6	24,5	15,7		14,6	15,5	19,0
LJLA	14,2	15,8	18,2	18,9	18,9	17,9	16,3	13,4	12,9	12,8	13,4	14,5
LKAA	10,0	11,0	11,7	12,0	11,0	11,0	11,0	10,0	10,0	9,0	9,0	10,0
LOVV	11,0	13,0	13,0	13,0	13,0	13,0	12,0	10,0	10,0	10,0	10,0	10,0
LPPC							33,5	37,9	56,4	33,6	19,2	37,5
LRBB	6,7	7,3	7,9	8,2	8,3	8,4	7,5	7,3	7,1	7,6	7,3	7,5
LSAG	11,0	13,0	13,8	13,8	15,1	14,3	11,9	10,2	10,5	10,5	10,5	11,1
LSAZ	13,0	14,0	16,0	16,1	16,7	16,1	14,4	11,7	11,6	11,0	12,0	12,2

Figure 2-7: Monthly 95<sup>th</sup> percentile of TRTD per Centre

## Monthly 99<sup>th</sup> percentile of TRTD per Centre

TRTD												
Atsu Code	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023
EDUU	39,3	42,0	45,4	42,2	40,5	39,6	27,7	21,3	21,7	21,5	21,6	27,8
EDYY	28,8	31,3	30,1	27,1	27,1	27,2	25,5	21,5	21,8	20,9	21,2	22,0
EETT										14,0	17,0	
EGPX	37,4	38,5	38,0	29,1	37,5	35,5	23,3	19,6	20,1	18,5	19,8	20,7
EGTT	24,7	24,6	24,1	23,2	23,3	24,8	22,6	21,7	21,9	21,5	21,9	22,1
EISN								184,7	152,4	108,6	95,9	
EKDK	18,0	21,0	24,0	21,0	21,0	21,0	20,0	18,0	19,0	18,0	18,0	18,0
EPWW	14,9	14,0	21,6	21,9	21,3	22,0	16,0	21,1	16,6	21,4	15,2	17,9
ESMM	13,0	13,0	14,0	13,0	14,0	14,0	13,0	13,0	13,0	13,0	12,0	13,0
ESOS	14,0	14,0	15,0	13,0	15,0	14,0	13,0	12,0	13,0	12,0	12,0	12,0
EVRR	37,0	39,0	38,0	31,0	37,0	36,1	17,0	16,0	15,0	16,0	16,0	14,0
EYVC	13,0	16,7	14,0	17,2	11,9	12,0	9,0	9,0	10,0	9,0	10,0	9,0
GCCC	83,6	107,2	86,5	64,1	91,7	89,2	35,5	88,0	107,6	65,9	87,1	116,3
LDZO	29,0	34,0	35,0	34,0	37,0	37,0	32,0	28,0	27,0	25,0	28,0	27,0
LECB	23,1	22,2	23,3	22,7	24,6	23,2	21,1	19,8	18,7	21,8	24,0	19,3
LECM	38,1	24,3	38,8	29,0	28,3	29,7	27,8	43,4	39,8	38,6	44,3	39,7
LFBB	14,0	16,0	16,0	18,0	18,0	17,0	15,0	14,0	14,0	14,0	15,0	15,0
LFEE	18,0	19,0	21,0	22,0	21,0	22,0	20,0	17,0	17,0	17,0	17,0	20,0
LFFF	24,0	26,0	34,0	39,0	37,0	38,0	34,0	30,0	29,0	25,0	26,0	31,0
LFMM	24,0	24,0	29,0	37,0	38,0	36,0	30,0	24,0	15,0	15,0	17,0	16,0
LFRR		17,0	19,0	23,0	21,0	21,0	20,0	18,0	18,0	18,0	18,0	20,0
LHCC	18,0	20,0	23,0	26,0	26,0	26,0	19,0	16,0	17,0	18,0	17,0	17,0
LIBB	279,5	97,1	98,8	87,1	133,7	181,6	106,0	86,4	85,7	78,4	85,1	86,5
LIMM	184,3	184,5	185,5	194,2	191,7	185,5	190,1	184,2	182,3	181,0	182,2	181,8
LIPP	182,5	186,1	191,0	187,6	191,9	183,2	189,4	183,9	186,4	181,8	184,6	186,5
LIRR	385,0	181,8	181,8	182,5	185,8	181,8	181,5	94,0		90,7	100,5	120,3
LJLA	43,6	47,0	60,5	60,5	64,1	57,6	55,2	35,2	28,3	31,4	37,6	41,5
LKAA	33,0	34,0	37,0	38,0	33,0	35,0	32,0	29,0	26,2	29,0	25,0	26,0
LOVV	37,0	38,0	38,0	37,0	37,0	37,0	32,0	23,0	28,0	28,0	25,0	27,0
LPPC							181,1	183,0	186,8	181,9	112,2	181,4
LRBB	21,9	23,2	22,8	25,0	29,9	35,9	21,9	22,4	22,7	22,8	25,1	23,0
LSAG	38,0	41,0	46,5	43,5	52,3	46,1	32,7	26,5	28,5	27,3	28,3	32,1
LSAZ	47,0	54,4	69,0	62,1	62,9	54,1	47,7	30,8	31,6	27,2	33,0	32,9

Figure 2-8: Monthly 99<sup>th</sup> percentile of TRTD per Centre

## Overall RCTP Technical Continuity

The graph below shows the Required Communications Technical Performance Technical Continuity [RCTP\_TC(32) and RCTP\_TC(20)]. This is the probability that a LACK/ERROR is received for an uplink message within 32 seconds or 20 seconds.

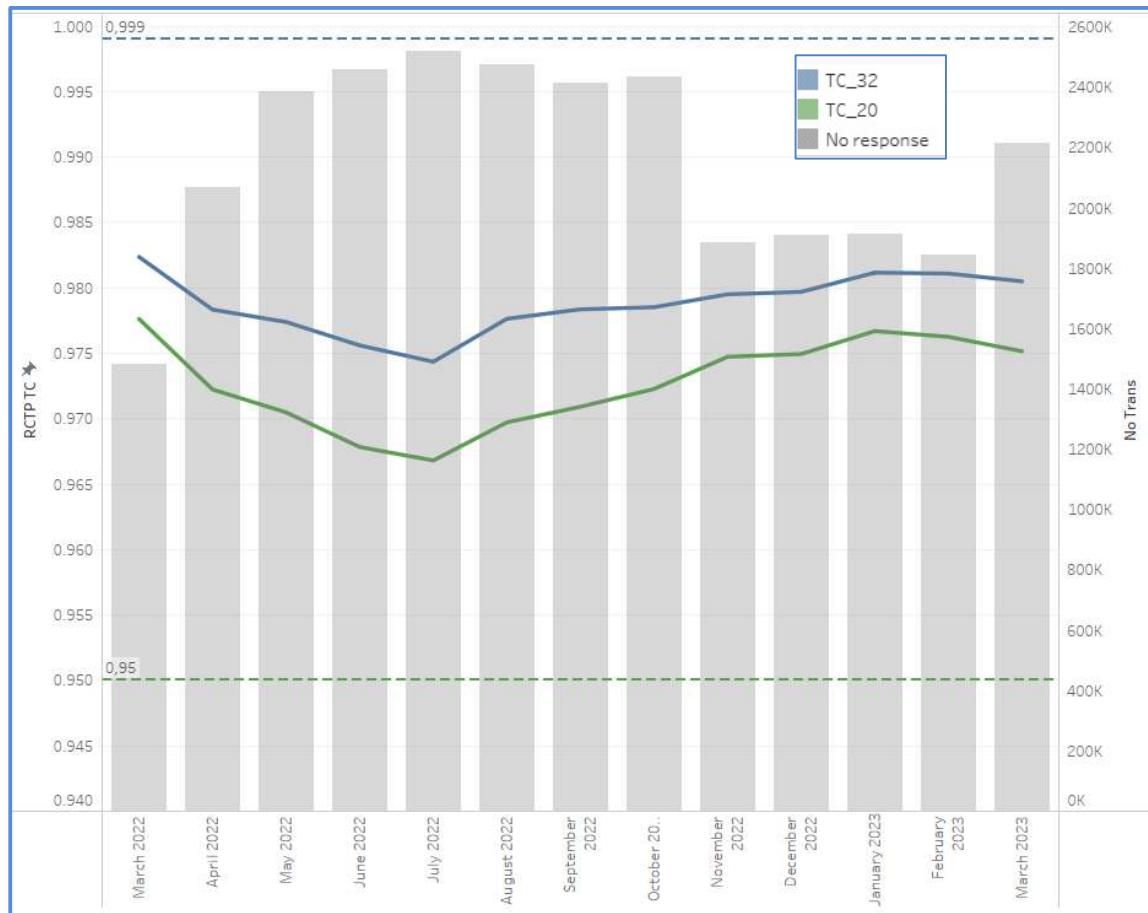


Figure 2-9: Technical Continuity

## RCTP Technical Continuity per Centre

The table below shows the RTCP TC at 32s per Centre and per month.

Atsu	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023
EDUU	0,986	0,984	0,983	0,982	0,982	0,984	0,984	0,988	0,991	0,990	0,991	0,990	0,987
EDYY	0,989	0,986	0,985	0,985	0,987	0,986	0,986	0,988	0,990	0,990	0,991	0,989	0,990
EETT											0,993	0,994	
EGPX	0,987	0,984	0,983	0,983	0,985	0,983	0,983	0,988	0,991	0,991	0,991	0,991	0,991
EGTT	0,990	0,988	0,988	0,988	0,989	0,989	0,987	0,990	0,991	0,990	0,991	0,991	0,991
EISN									0,842	0,876	0,875	0,883	
EKDK	0,988	0,987	0,986	0,986	0,987	0,987	0,987	0,987	0,989	0,987	0,989	0,988	0,987
EPWW	0,993	0,991	0,992	0,989	0,989	0,990	0,989	0,991	0,989	0,990	0,987	0,990	0,989
ESMM	0,994	0,993	0,991	0,991	0,992	0,992	0,991	0,994	0,993	0,992	0,994	0,993	0,993
ESOS	0,984	0,985	0,987	0,985	0,988	0,986	0,988	0,990	0,991	0,990	0,990	0,989	0,990
EVRR	0,977	0,977	0,976	0,977	0,980	0,980	0,978	0,986	0,987	0,988	0,986	0,989	0,985
EYVC		0,992	0,992	0,993	0,992	0,995	0,993	0,994	0,994	0,994	0,994	0,992	0,993
GCCC	0,880	0,902	0,859	0,865	0,888	0,879	0,876	0,965	0,916	0,903	0,906	0,913	0,903
LDZO	0,974	0,976	0,971	0,968	0,965	0,963	0,965	0,970	0,976	0,978	0,981	0,978	0,980
LECB	0,984	0,986	0,988	0,986	0,987	0,985	0,983	0,990	0,990	0,990	0,990	0,987	0,990
LECM	0,981	0,982	0,984	0,981	0,983	0,982	0,982	0,984	0,978	0,980	0,981	0,979	0,980
LFBB	0,974	0,975	0,974	0,913	0,867	0,864	0,862	0,868	0,865	0,871	0,871	0,863	0,872
LFEE	0,984	0,890	0,892	0,894	0,891	0,890	0,890	0,893	0,898	0,892	0,892	0,886	0,894
LFFF	0,952	0,949	0,949	0,850	0,773	0,778	0,780	0,777	0,817	0,889	0,888	0,886	0,888
LFMM	0,946	0,952	0,950	0,891	0,843	0,845	0,842	0,848	0,847	0,864	0,864	0,855	0,865
LFRR	0,970		0,969	0,907	0,866	0,867	0,868	0,874	0,875	0,883	0,885	0,881	0,882
LHCC	0,990	0,990	0,990	0,987	0,985	0,986	0,985	0,991	0,993	0,992	0,991	0,992	0,992
LIBB	0,963	0,954	0,954	0,938	0,902	0,945	0,941	0,945	0,960	0,965	0,961	0,967	0,970
LIMM	0,951	0,939	0,930	0,927	0,857	0,927	0,927	0,857	0,886	0,890	0,898	0,923	0,938
LIPP	0,957	0,939	0,923	0,912	0,880	0,912	0,921	0,827	0,844	0,812	0,804	0,893	0,921
LIRR	0,948	0,946	0,950	0,933	0,838	0,932	0,938	0,940	0,952		0,959	0,962	0,958
LJLA	0,979	0,976	0,971	0,964	0,962	0,961	0,964	0,970	0,984	0,984	0,986	0,982	0,980
LKAA	0,990	0,987	0,985	0,983	0,983	0,987	0,986	0,988	0,989	0,989	0,989	0,988	0,990
LOVV	0,971	0,971	0,967	0,965	0,968	0,969	0,968	0,975	0,982	0,979	0,978	0,977	0,977
LPPC								0,928	0,920	0,902	0,937	0,953	0,939
LRBB	0,985	0,988	0,987	0,985	0,985	0,985	0,984	0,988	0,987	0,987	0,985	0,986	0,987
LSAG	0,986	0,982	0,982	0,981	0,980	0,980	0,980	0,986	0,988	0,988	0,988	0,987	0,986
LSAZ	0,986	0,981	0,980	0,975	0,974	0,977	0,980	0,983	0,989	0,988	0,990	0,988	0,987

Figure 2-10: RCTP Technical Continuity per Centre at 32s

The table below shows the RTCP TC at 20s per Centre and per month.

RCTP TC 20 ANSP Table													
Atsu	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023
EDUU	0.9804	0.9776	0.9755	0.9726	0.9735	0.9752	0.9757	0.9803	0.9868	0.9857	0.9866	0.9852	0.9808
EDYY	0.9837	0.9789	0.9774	0.9769	0.9784	0.9782	0.9778	0.9798	0.9846	0.9839	0.9860	0.9835	0.9836
EETT											0.9904	0.9910	
EGPX	0.9831	0.9793	0.9766	0.9764	0.9778	0.9767	0.9766	0.9826	0.9864	0.9871	0.9870	0.9865	0.9862
EGTT	0.9843	0.9806	0.9801	0.9807	0.9814	0.9812	0.9796	0.9824	0.9848	0.9840	0.9852	0.9840	0.9836
EISN										0.8340	0.8705	0.8694	0.8776
EKDK	0.9861	0.9849	0.9831	0.9820	0.9836	0.9830	0.9834	0.9840	0.9861	0.9849	0.9870	0.9850	0.9843
EPWW	0.9897	0.9880	0.9893	0.9845	0.9849	0.9859	0.9844	0.9877	0.9847	0.9866	0.9832	0.9873	0.9856
ESMM	0.9928	0.9912	0.9896	0.9894	0.9913	0.9903	0.9895	0.9927	0.9923	0.9910	0.9926	0.9919	0.9921
ESOS	0.9828	0.9846	0.9864	0.9837	0.9875	0.9853	0.9865	0.9894	0.9904	0.9887	0.9895	0.9883	0.9895
EVRR	0.9739	0.9745	0.9732	0.9732	0.9754	0.9768	0.9750	0.9843	0.9855	0.9866	0.9850	0.9864	0.9837
EYVC		0.9904	0.9892	0.9901	0.9892	0.9932	0.9923	0.9941	0.9934	0.9935	0.9934	0.9917	0.9926
GCCC	0.8721	0.8959	0.8515	0.8548	0.8804	0.8726	0.8642	0.9605	0.9111	0.8979	0.9000	0.9067	0.8955
LDZO	0.9682	0.9685	0.9627	0.9578	0.9553	0.9519	0.9543	0.9618	0.9700	0.9728	0.9762	0.9730	0.9736
LECB	0.9780	0.9808	0.9829	0.9807	0.9815	0.9783	0.9770	0.9848	0.9853	0.9858	0.9848	0.9813	0.9858
LECM	0.9769	0.9774	0.9803	0.9762	0.9781	0.9768	0.9776	0.9790	0.9729	0.9753	0.9762	0.9729	0.9754
LFBB	0.9719	0.9737	0.9717	0.9099	0.8646	0.8615	0.8595	0.8661	0.8633	0.8693	0.8696	0.8613	0.8701
LFEE	0.9795	0.8873	0.8881	0.8880	0.8848	0.8841	0.8841	0.8876	0.8943	0.8884	0.8888	0.8828	0.8904
LFFF	0.9478	0.9428	0.9411	0.8411	0.7639	0.7692	0.7709	0.7690	0.8108	0.8832	0.8826	0.8806	0.8815
LFMM	0.9428	0.9463	0.9440	0.8859	0.8374	0.8402	0.8366	0.8443	0.8441	0.8621	0.8621	0.8529	0.8630
LFRR	0.9674		0.9652	0.9036	0.8613	0.8634	0.8646	0.8709	0.8715	0.8803	0.8824	0.8780	0.8785
LHCC	0.9872	0.9870	0.9855	0.9815	0.9797	0.9800	0.9802	0.9866	0.9892	0.9883	0.9874	0.9885	
LIBB	0.9572	0.9477	0.9457	0.9267	0.8946	0.9344	0.9314	0.9358	0.9556	0.9608	0.9578	0.9631	0.9664
LIMM	0.9461	0.9306	0.9201	0.9157	0.8462	0.9165	0.9158	0.8500	0.8806	0.8850	0.8932	0.9171	0.9307
LIPP	0.9496	0.9295	0.9105	0.8987	0.8680	0.8953	0.9074	0.8176	0.8376	0.8058	0.7995	0.8867	0.9119
LIRR	0.9434	0.9394	0.9427	0.9240	0.8272	0.9197	0.9291	0.9340	0.9476		0.9548	0.9573	0.9517
LJLA	0.9727	0.9679	0.9591	0.9485	0.9449	0.9438	0.9489	0.9581	0.9777	0.9778	0.9797	0.9739	0.9712
LKAA	0.9888	0.9853	0.9827	0.9806	0.9797	0.9839	0.9835	0.9864	0.9878	0.9879	0.9878	0.9872	0.9882
LOVV	0.9672	0.9665	0.9599	0.9570	0.9601	0.9608	0.9598	0.9687	0.9778	0.9749	0.9746	0.9730	0.9722
LPPC								0.9222	0.9135	0.8947	0.9311	0.9479	0.9318
LRBB	0.9810	0.9838	0.9826	0.9796	0.9797	0.9797	0.9790	0.9839	0.9826	0.9827	0.9807	0.9808	0.9823
LSAG	0.9816	0.9751	0.9726	0.9707	0.9705	0.9680	0.9686	0.9786	0.9821	0.9825	0.9829	0.9812	0.9798
LSAZ	0.9806	0.9725	0.9697	0.9627	0.9623	0.9637	0.9668	0.9730	0.9820	0.9819	0.9847	0.9812	0.9796

Figure 2-11: RCTP Technical Continuity per Centre at 20s

### 3. VDL Mode 2 Performance

The following metrics are computed based on the available data from the VGS logs provided to NM by ARINC and SITA. ENAV is currently evaluating how to also provide to NM their VGS logs.

Before April 2022, the logs contained the AVLC traffic recorded at each VGS during the 24hrs of the first Friday<sup>3</sup> of each month (one dataset per month).

From April 2022, the logs now contain AVLC traffic recorded at each VGS during the 24hrs of each Fridays<sup>4</sup> (one dataset per week). The aggregated number of AVLC frames taken into account per month for the metrics below has then increased compared to the data provided before April 2022. The increase in the number of AVLC frames used to compute the metrics improves the confidence in the metric value (narrower confidence interval) and any possible observed changes in the metric values before/after April 2022 should not be accounted to the increase of data.

To keep the trend of the AVLC traffic volume comparable with previous reports (prior to April 2022) it is now expressed as a daily average traffic volume for each month.

From April 2022, the statistics are no longer filtered on aircraft on the logon-list. This filtering measure was set up before April 2021 when VGS logs from ACSPs were incomplete.

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<sup>3</sup> Friday is observed to have the highest flight traffic of the week.

<sup>4</sup> The frequency of log provision has been increased from one day per month to one day per week.

## AVLC Round Trip Time

The graph below shows the cumulative distributions per frequency (and per CSP) for the AVLC Round Trip Time (RTT) of acknowledged AVLC INFO frames conveying ATN packet considering all the VGS logs. The 95<sup>th</sup> and the 99.9<sup>th</sup> percentile of CSP allocation from ED-120 and ED-228A are also provided for information (red and blue dashed lines). Please note the logarithmic scale of the delays.

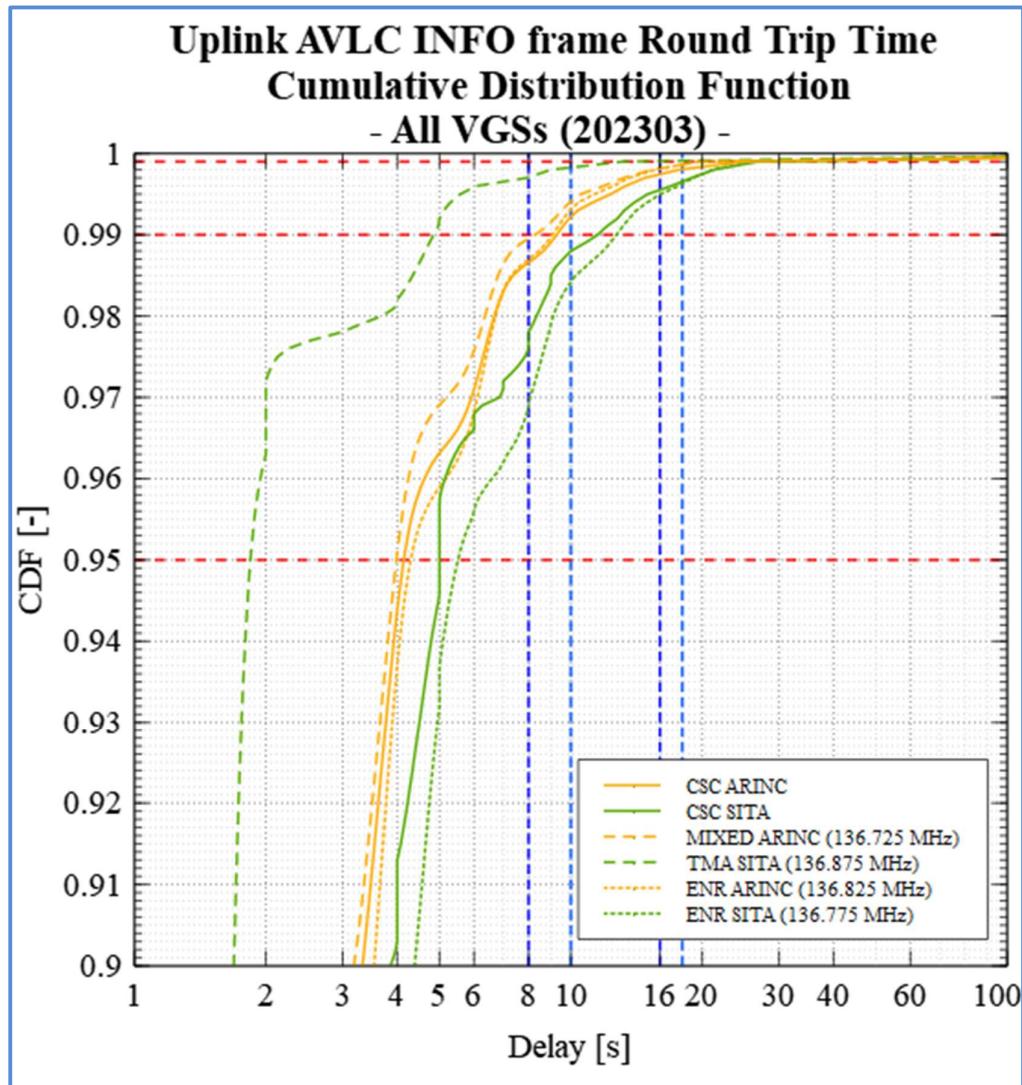


Figure 3-1: AVLC Round Trip Time

## AVLC Reliability

The graph below shows the cumulative distributions per frequency (and per CSP) for the AVLC Reliability<sup>5</sup> of AVLC INFO frames conveying ATN packet considering all the VGS logs. The 95<sup>th</sup> and the 99.9<sup>th</sup> percentile of CSP allocation from ED-120 and ED-228A are also provided for information (red and blue dashed lines). Please note the logarithmic scale of the delays.

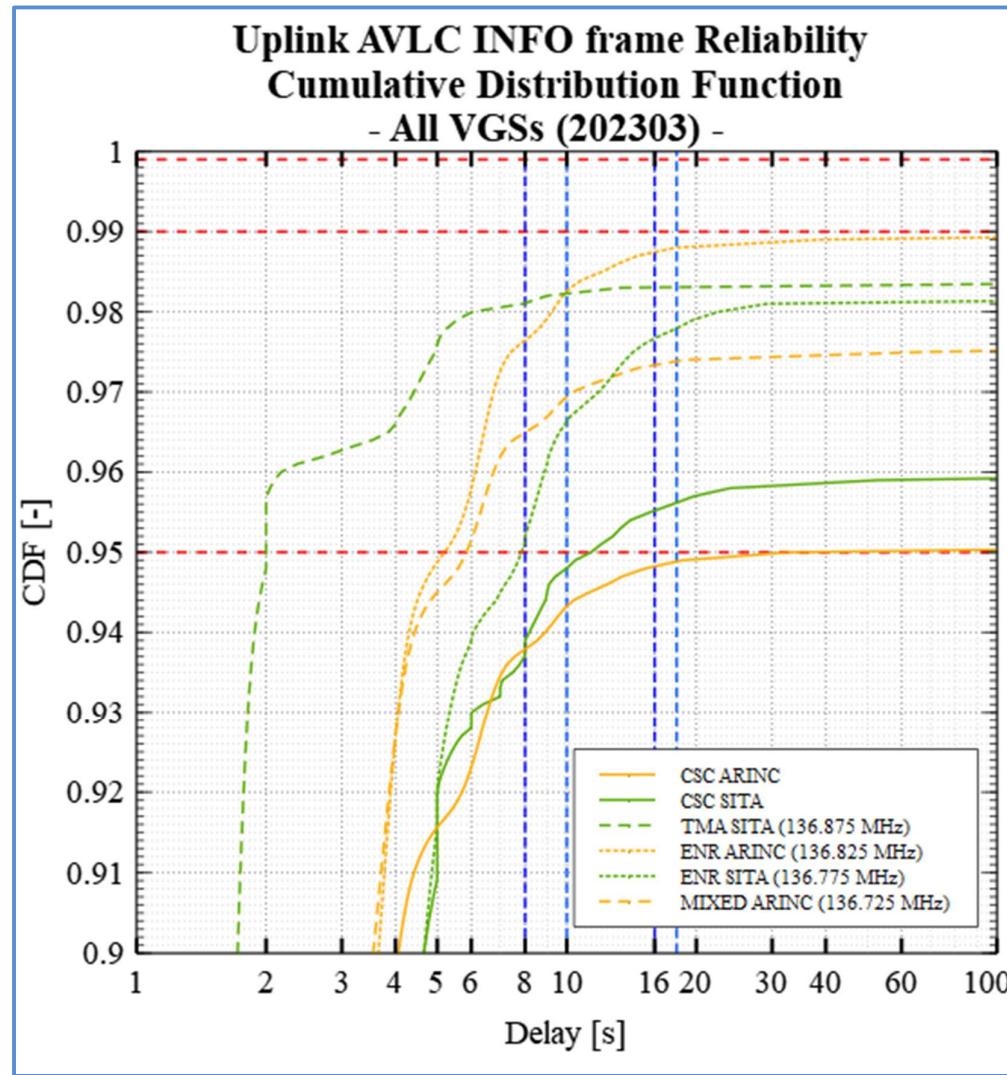


Figure 3-2: AVLC Reliability

Note: AVLC RTT and Reliability are related to each other in the following way: AVLC RTT only consider acknowledged AVLC frames while Reliability consider non-acknowledged ones (lost frames).

<sup>5</sup> Reliability is defined as the probability that an AVLC frame is acknowledged before a specific time. An "infinite" duration is taken for AVLC frames not acknowledged.

## Number of retransmissions

The graph below shows the cumulative distributions per frequency (and per CSP for the CSC) for the number of retransmissions needed before acknowledgement of uplink AVLc INFO frames conveying ATN packet considering all the VGS logs. N=0 represents successes on the first attempt, N=1 to N=5 represent successes on the first to the fifth retransmissions and N>5 represents N2T1 events.

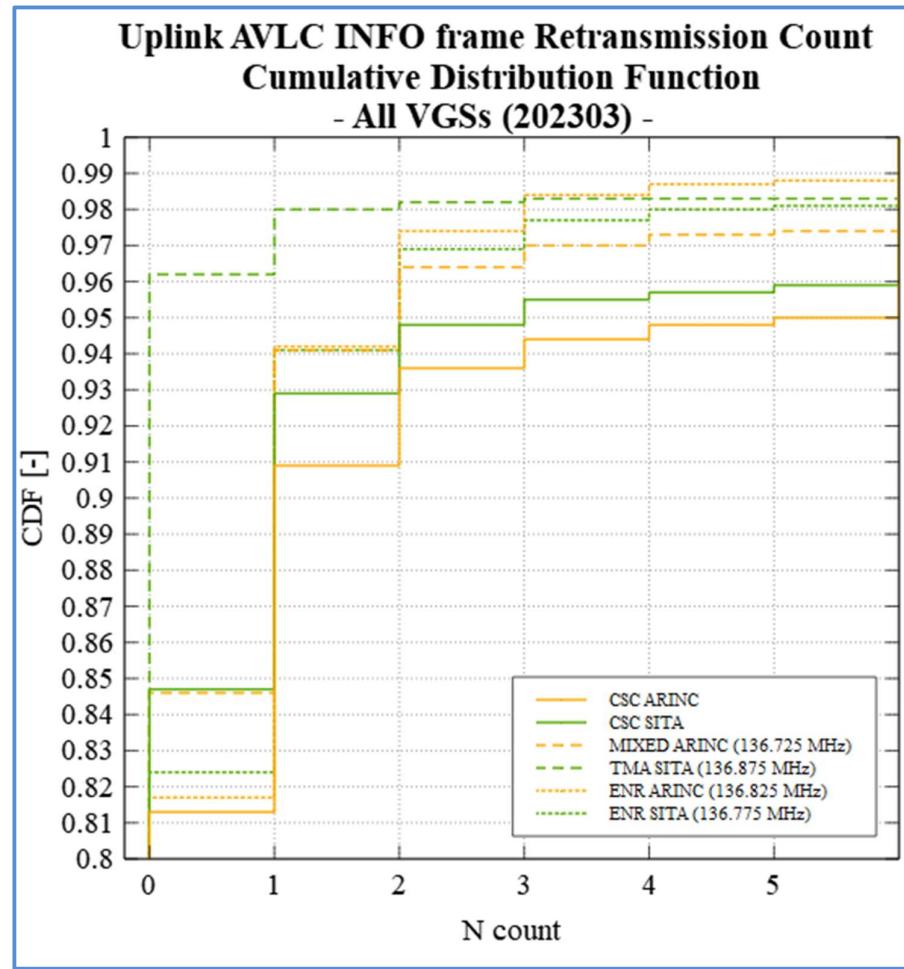


Figure 3-3: AVLc Uplink INFO frame retransmission count

## AVLC Round Trip Time per frequency trend

The following set of graphs show the 95<sup>th</sup>, 99<sup>th</sup> and the 99.9<sup>th</sup> percentiles of the AVLC RTT (in seconds) of acknowledged AVLC INFO frames conveying ATN packet for each month and for each frequency with the CSC split over the two CSPs. The RTT axis has a logarithmic scale with the same range for the different frequencies. The graphs also shows the number of AVLC frames taken into account in the percentiles calculations (Frame count in linear scale) and the 95% confidence interval (gray area).

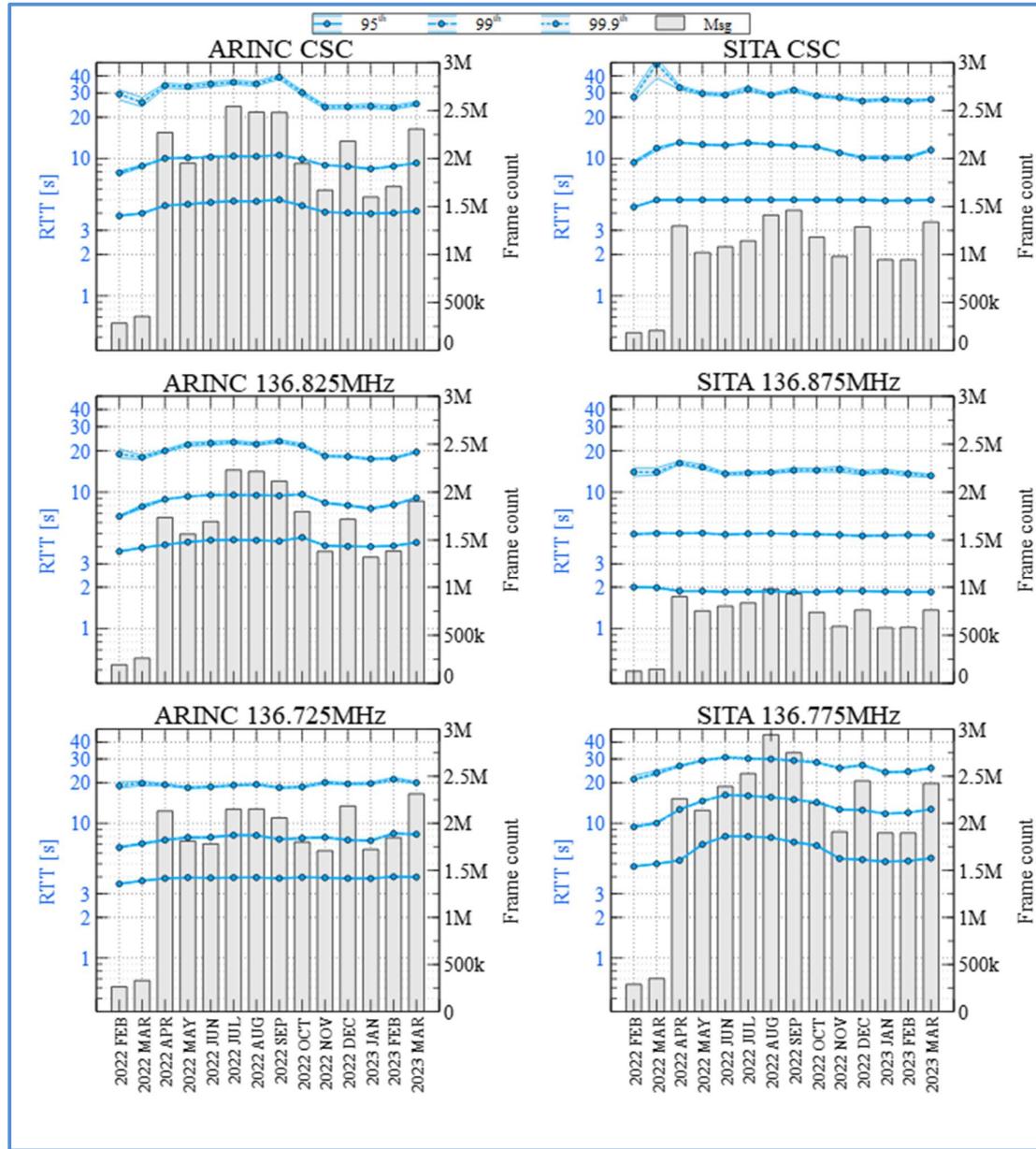


Figure 3-4: AVLC Uplink INFO Round Trip Time per Frequency

## Uplink delivery success rate

The following set of graphs show the uplink delivery rate of AVLC INFO frames conveying ATN packet for each month and for each frequency with the CSC split over the two CSPs. It is the probability that an AVLC uplink INFO frame is correctly delivered to the aircraft (ACK received). The graphs also show the number of AVLC frames taken into account in the calculations (Msg count in linear scale = AVLC frame count sent on first attempt) and the 95% confidence interval (gray area).

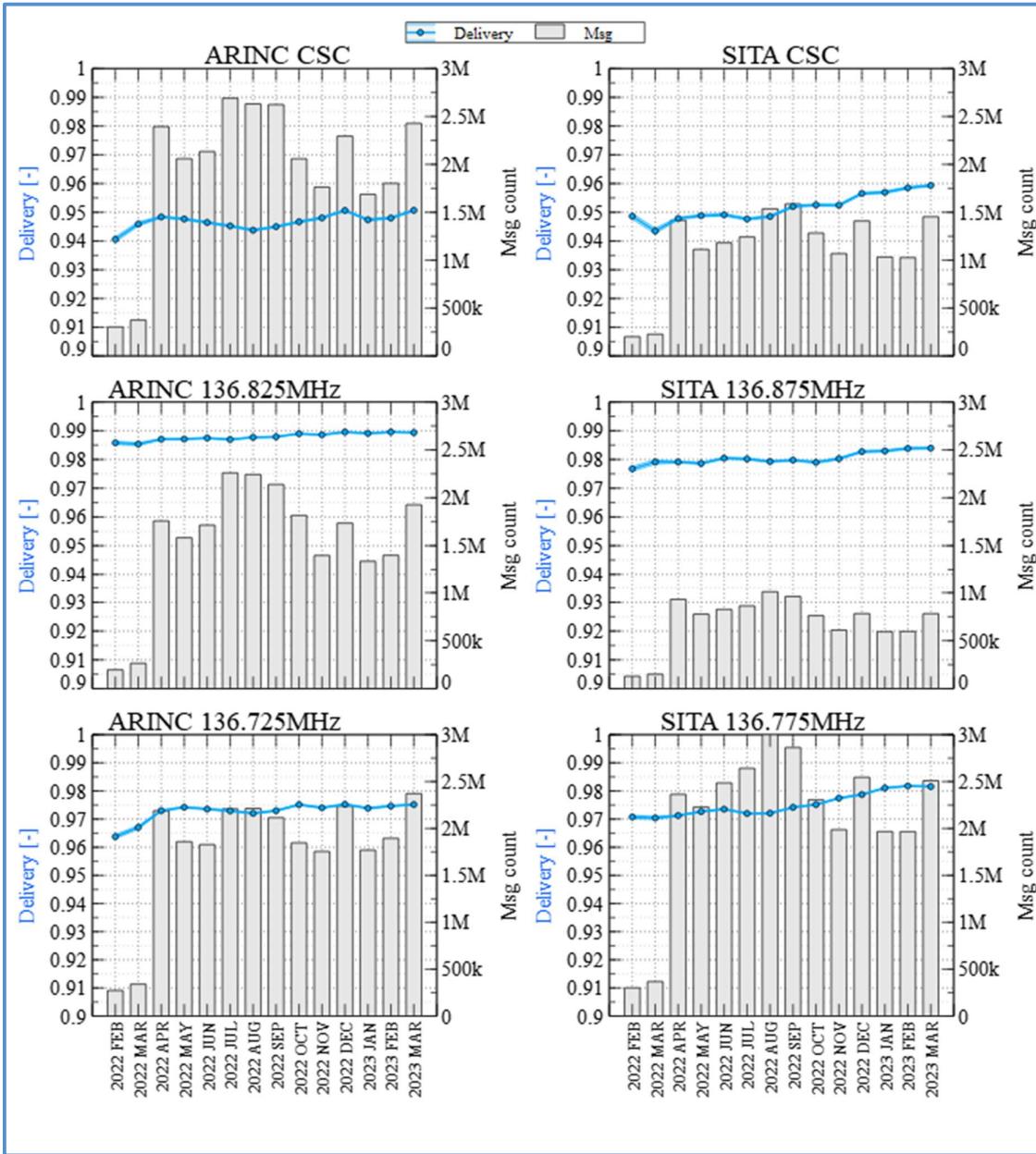


Figure 3-5: AVLC successful delivery rate per frequency

## Reliability

The following set of graphs show the uplink reliability of AVLC INFO frames conveying ATN packet for each month and for each frequency with the CSC split over the two CSPs. It is the probability that an AVLC uplink INFO frame is correctly delivered to the aircraft (ACK received) within a specific duration (10 and 18 seconds). The graphs also show the number of AVLC frames taken into account in the calculations (Msg count in linear scale = AVLC frame count sent on first attempt) and the 95% confidence interval (gray area).

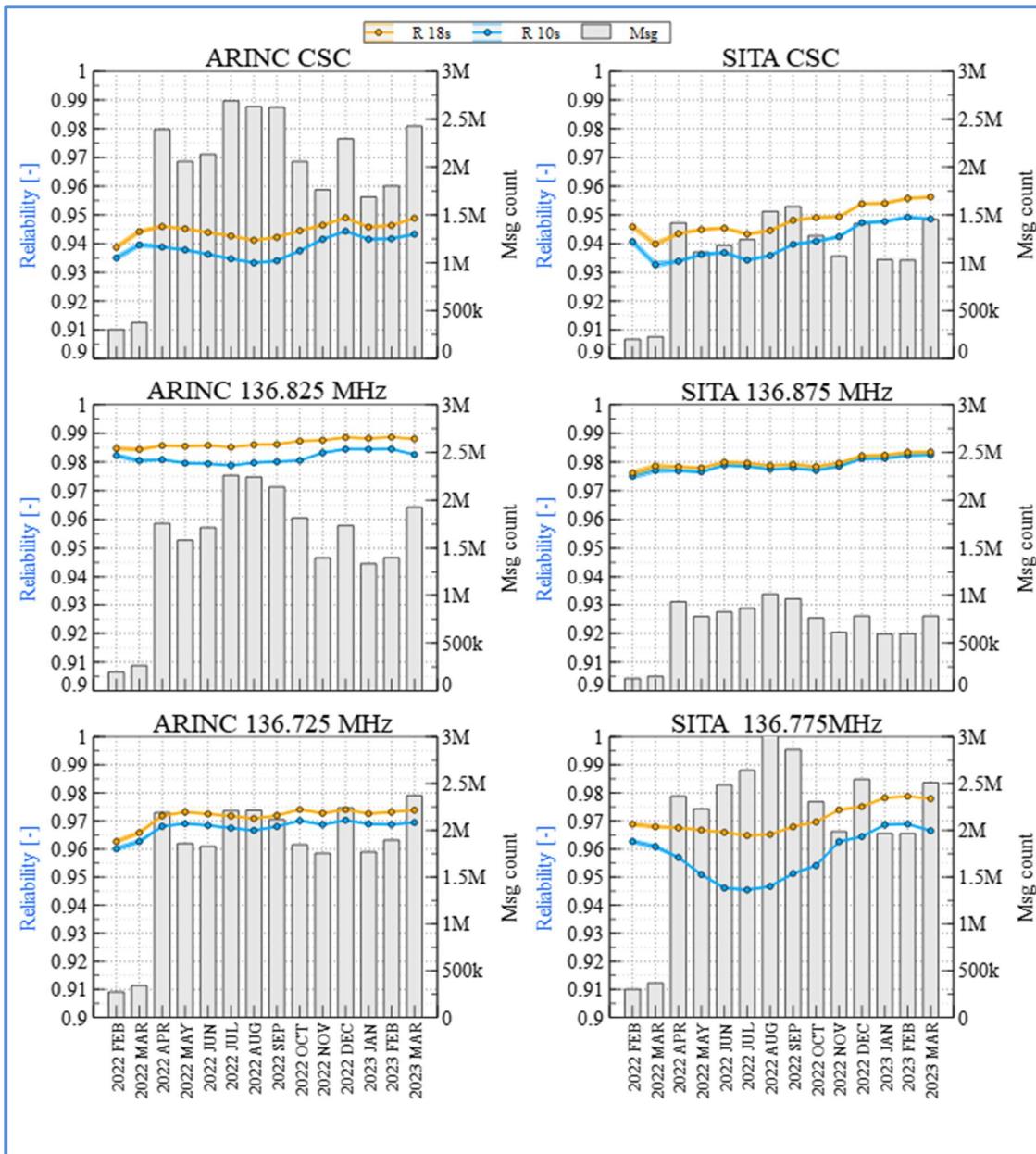


Figure 3-6: AVLC Reliability per frequency

## Daily average channel load per frequency trend

The following set of graphs show the daily average channel load per AVLC payload type (ATN, AOA and AVLC protocol related frames<sup>6</sup>) for each month and for each frequency. An additional graph split the traffic on the CSC between ACSPs. The channel load is expressed in megabytes with the same range for the different frequencies.

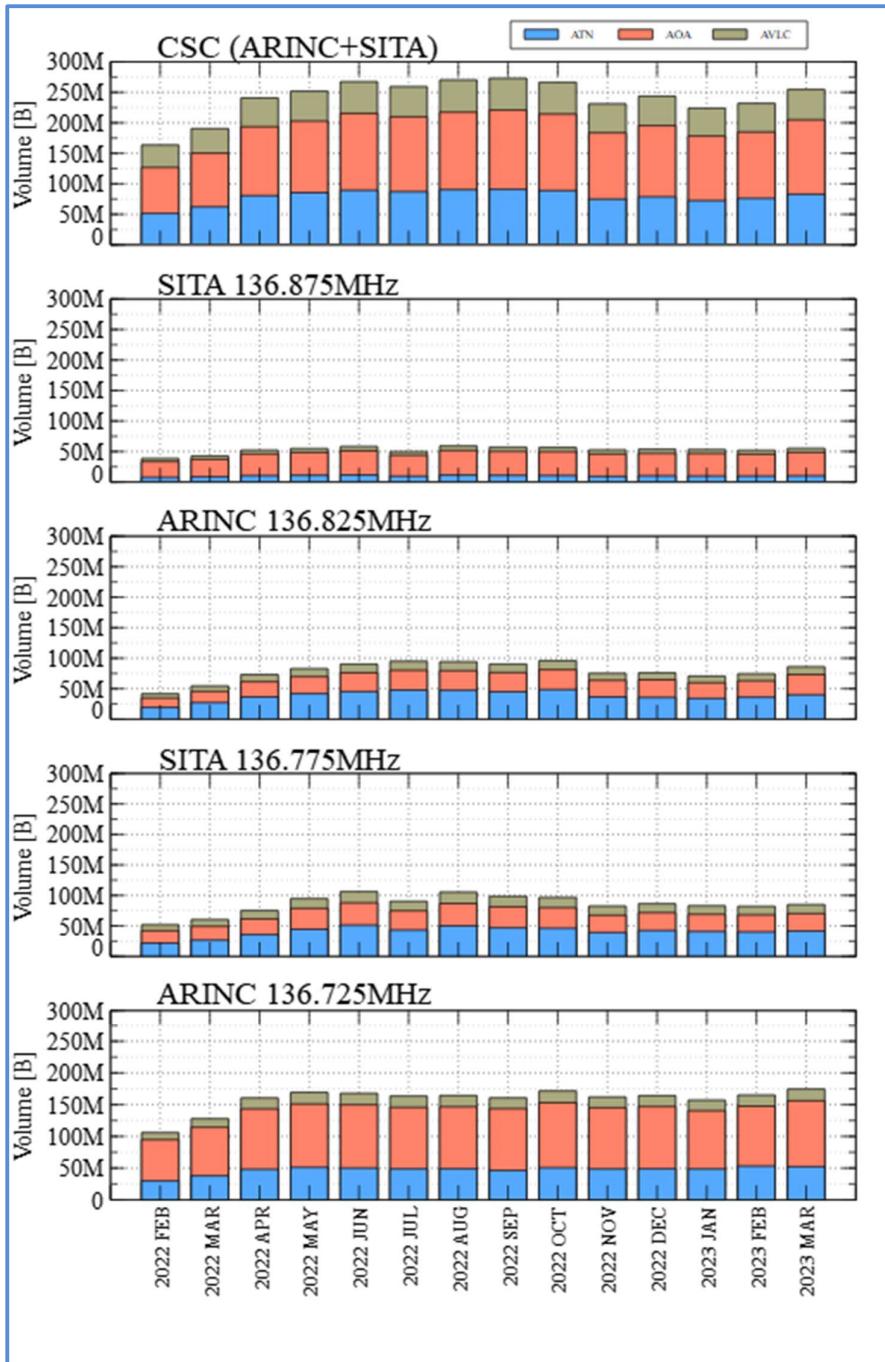


Figure 3-7: Daily average AVLC Channel load per frequency

<sup>6</sup> i.e. RR, SREJ, XID, ...

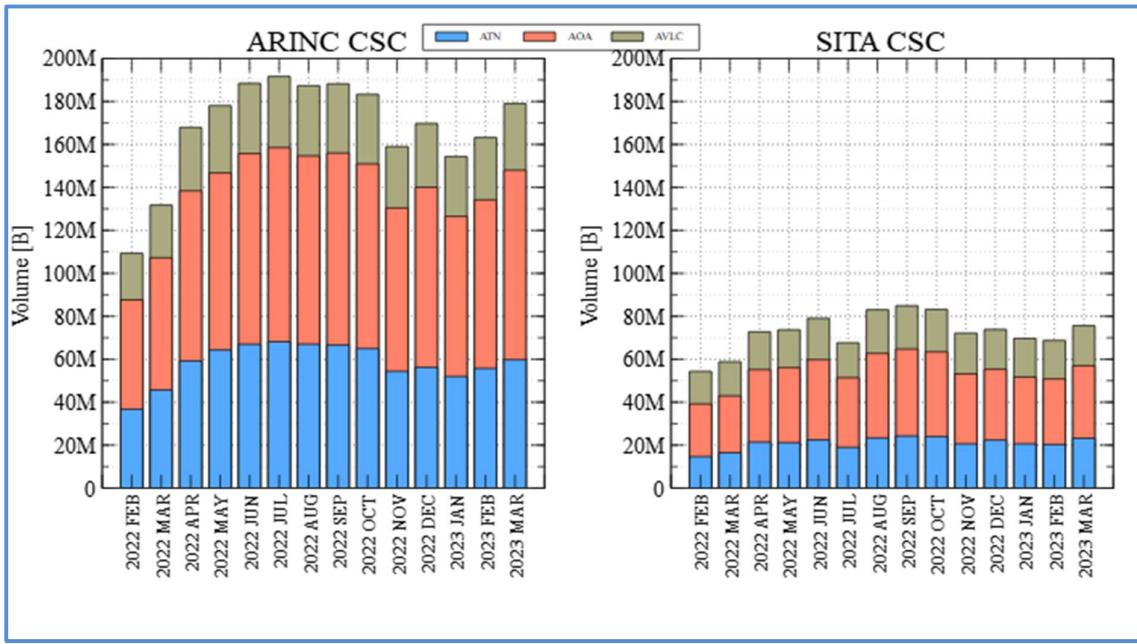


Figure 3-8: Daily average AVLC load on the CSC

## Appendix A: LISAT Data Available

The table below shows the number of CPDLC flights in the LISAT database per day, per Centre for the month when this report was created. The data available for this month, computed on the 17 April 2023, may be different in subsequent months if additional data is uploaded by the ANSPs.

	EDIU	EDYY	EGPX	EGTT	EISN	EOK	EPWW	ESMM	ESOS	EVRR	EYIC	GCCC	LDZ0	LECB	LECM	LFBB	LFEE	LFFF	LFMM	LFRR	LHCC	LBB	LIMM	LIPP	LIRR	LILA	LKAA	LOVV	LPPC	LRBB	LSAG	LSAZ
1 March 2023	1.782	2.094	489	2.804	254	605	542	547	270	74	69	107	496	911	1.728	1.054	1.018	957	933	1.311	836	143	122	230	271	460	1.093	913	623	548	556	
2 March 2023	1.880	2.187	473	2.990	263	624	629	578	292	86	97	125	507	973	1.907	1.194	1.083	1.073	1.055	1.484	874	104	183	126	260	272	460	1.137	1.032	635	643	606
3 March 2023	2.097	2.441	528	3.176	251	720	729	654	321	97	100	123	624	1.132	2.157	1.319	1.209	1.141	1.154	1.651	952	141	205	156	231	334	516	1.279	1.063	721	705	660
4 March 2023	2.024	2.250	559	3.069	244	679	766	634	287	97	108	184	635	1.057	2.301	1.108	1.242	1.107	1.092	1.737	942	216	149	238	358	513	1.231	1.243	775	697	683	
5 March 2023	2.104	2.454	615	3.221	235	749	729	670	335	91	99	129	691	1.078	2.159	1.297	1.276	1.164	1.168	1.715	972	150	209	163	287	356	532	1.278	1.097	776	780	739
6 March 2023	2.033	1.992	640	196	792	743	652	349	70	106	85	578	1.055	2.087	1.248	1.086	1.105	1.098	1.494	893	126	214	209	275	296	472	1.149	970	683	656	628	
7 March 2023	1.792	1.948	499	2.647	255	624	602	521	248	61	94	130	541	853	1.714	905	719	707	829	1.002	846	119	160	158	246	263	404	1.002	885	718	527	543
8 March 2023	1.853	2.021	562	2.572	193	641	592	573	272	93	95	111	553	827	1.573	901	732	1.008	837	128	147	123	216	289	457	1.031	766	661	498	510		
9 March 2023	2.004	2.147	640	2.982	203	681	710	645	328	98	108	125	502	905	1.763	959	846	787	912	1.220	915	143	173	220	296	474	1.104	897	749	594	610	
10 March 2023	2.306	2.379	667	3.109	198	715	753	659	334	92	98	112	618	985	1.939	1.033	879	849	925	1.322	951	206	205	145	357	593	1.237	953	722	591	605	
11 March 2023	2.324	2.411	552	3.061	270	652	783	623	258	101	115	147	645	1.002	2.117	1.107	916	894	967	1.412	1.013	157	188	154	144	360	600	1.232	1.089	806	616	690
12 March 2023	2.343	2.615	648	3.368	210	745	757	684	336	91	111	134	695	1.049	2.145	1.153	984	965	986	1.606	993	120	232	177	260	380	551	1.278	1.041	803	644	695
13 March 2023	1.907	2.105	625	3.041	206	716	721	631	314	79	91	96	618	1.025	1.958	1.117	1.038	1.019	1.069	1.449	886	217	126	270	302	465	1.148	982	685	600	557	
14 March 2023	1.753	1.945	501	2.710	184	635	623	554	265	83	100	94	523	871	1.799	985	934	973	971	1.287	878	104	171	103	232	286	447	1.100	937	713	592	543
15 March 2023	1.980	2.250	520	2.767	231	657	599	615	323	75	80	84	547	873	1.630	991	770	886	895	1.053	852	169	103	216	297	451	1.076	845	674	511	523	
16 March 2023	1.821	2.081	515	2.889	236	670	657	620	330	86	118	103	500	956	1.875	1.125	1.066	973	1.063	1.417	890	169	128	192	250	492	1.065	856	715	645	657	
17 March 2023	2.062	2.295	575	3.285	225	720	759	649	348	85	102	119	689	1.037	2.045	1.215	1.144	1.097	1.158	1.568	932	147	213	178	260	364	542	1.231	1.053	716	693	660
18 March 2023	2.136	2.273	648	3.106	247	697	748	571	232	92	107	147	667	1.085	2.194	1.134	1.195	1.124	1.112	1.703	945	140	198	161	92	372	531	1.237	1.233	725	715	693
19 March 2023	2.187	2.427	586	3.275	212	744	779	671	345	86	106	127	699	1.129	2.145	1.261	1.235	1.131	1.129	1.659	967	207	151	252	379	573	1.313	1.067	718	720	667	
20 March 2023	2.185	2.564	513	3.222	198	746	716	643	308	78	106	89	641	1.051	2.012	1.258	1.170	989	929	1.597	878	180	201	155	107	364	521	1.234	932	654	585	641
21 March 2023	1.845	2.064	547	2.798	171	641	571	515	254	84	93	130	557	878	1.857	954	930	874	892	1.252	832	127	160	107	212	295	405	1.118	991	669	570	587
22 March 2023	2.001	2.145	571	2.804	135	642	581	548	286	96	76	109	545	910	1.702	962	757	885	876	1.196	840	119	172	129	234	303	435	1.032	884	662	556	584
23 March 2023	2.115	2.298	583	2.960	278	715	712	648	310	166	118	103	554	939	1.771	1.049	820	894	989	1.177	937	232	140	253	305	492	1.121	905	747	566	641	
24 March 2023	2.444	2.712	630	3.244	265	787	749	664	342	186	124	100	666	1.051	1.988	1.208	977	930	994	1.410	973	133	200	162	283	361	589	1.325	967	727	565	640
25 March 2023	2.274	2.429	570	3.099	302	658	751	585	235	165	109	156	662	1.059	2.191	1.226	1.012	926	1.061	1.438	969	193	176	235	337	601	1.174	1.170	756	628	786	
26 March 2023	2.423	2.693	652	3.353	328	794	849	681	318	167	132	107	854	1.243	2.030	1.393	1.051	924	1.130	1.507	1.025	203	235	184	311	454	646	1.380	1.059	719	589	758
27 March 2023	1.939	2.284	539	3.234	317	754	768	645	313	156	124	63	688	1.226	1.948	1.350	941	954	1.082	1.484	844	171	77	169	297	362	540	1.153	925	627	503	581
28 March 2023	2.313	2.553	655	3.368	312	795	810	642	321	177	126	102	723	1.191	1.997	1.255	950	882	1.058	1.471	1.042	145	180	289	404	592	1.306	935	777	567	652	
29 March 2023	2.499	2.672	696	3.349	302	781	794	665	291	175	110	88	388	1.272	2.016	1.299	1.015	903	1.085	1.471	1.021	234	181	200	428	610	1.374	937	705	547	700	
30 March 2023	2.513	2.819	696	3.578	285	824	801	688	338	187	125	98	408	1.354	2.164	1.314	1.041	983	1.222	1.701	1.060	211	206	197	353	423	622	1.411	1.008	699	579	726
31 March 2023	2.572	2.917	662	3.525	844	858	706	341	181	120	74	873	1.443	2.119	1.370	1.222	995	1.221	1.697	1.079	216	232	374	427	684	1.439	1.053	791	636	823		

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