



# Data link Network Operational Status Report

February 2023 – Developed 13/03/2023

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 February 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.
- Provision of LFEE and LFMM data which was interrupted previously has now resumed.
- As from January 2023, this report includes data from EETT (Estonia).
- 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

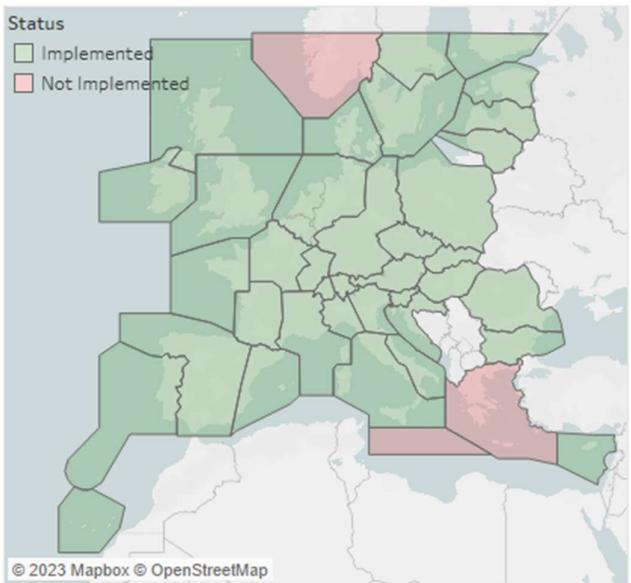
Figure 1-1 on the following page provides a status for each FIR/UIR covered by the DLS IR with a status as of the end of the reporting month. The top map shows the operational status of each centre (<N-4>). The map below shows which centres are providing LISAT data to NM. The table on the right shows 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

## Implementation Status



## Statistics

ATSU Code	Total Flights	PA Rate	% J1 Capable	% Using..
EDUU	112453	2	81%	46%
EDYY	102250	2	82%	58%
EETT	6681	0.8	85%	16%
EFIN	6603		85%	
EGPX	35737	5	79%	29%
EGTT	101088	4	79%	62%
EISN	28960	49.8	53%	17%
EKDK	24925	7.4	88%	58%
ENOR	15058		87%	
EPWW	30265	4	88%	45%
ESMM	23876	3	89%	65%
ESOS	12564	9	88%	53%
EVRR	9196	3	86%	40%
EYVC	6404	1.5	83%	30%
GCCC	21700	45	93%	13%
LBSR	48992		76%	
LCCC	26204		75%	
LDZO	34442	5	83%	43%
LECB	42140	4	88%	48%
LECM	82698	8	90%	56%
LFBB	47126	1	88%	60%
LFEE	60457	0	84%	47%
LFFF	40354	3	80%	50%
LFMM	49888	0	86%	50%
LFRR	60188	2	86%	60%
LGGG	37208		77%	
LHCC	51051	4	79%	43%
LIBB	19486	52	82%	15%
LIMM	38492	105	87%	10%
LIPP	34070	128	84%	8%
LIRR	39799	30	87%	13%
LJLA	17501	5	82%	46%
LKAA	26930	5	82%	50%
LMMM	6237		64%	
LOVV	54302	5	81%	52%
LPPC	41330	49.8	90%	65%
LRBB	38724	4	77%	37%
LSAG	24845	3	85%	45%
LSAZ	27898	2	81%	39%
LZBB	23022		79%	

## Providing Data to NM

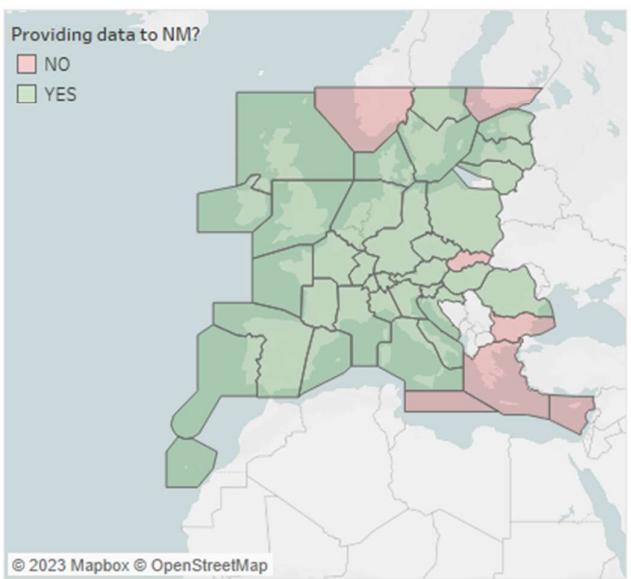


Figure 1-1: Current operational status of data link over the ATN

## 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, 82.1% of flights indicated the capability to perform CPDLC over ATN/VDL Mode 2. 14.4% (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).

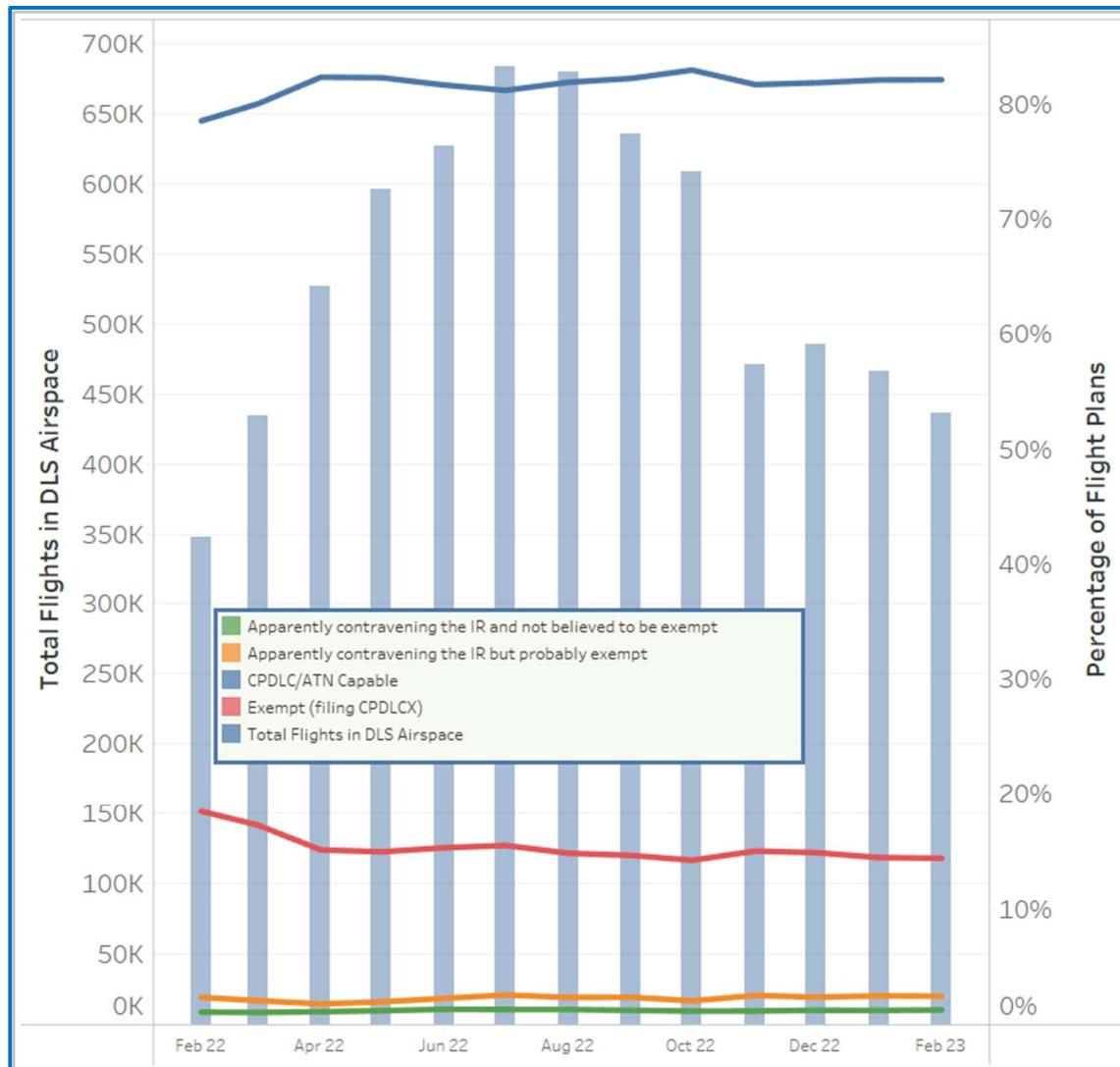


Figure 1-2: Proportion of flights capable of using CPDLC over ATN/ VDL Mode 2

<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 6.0 PAs per 100 hours.

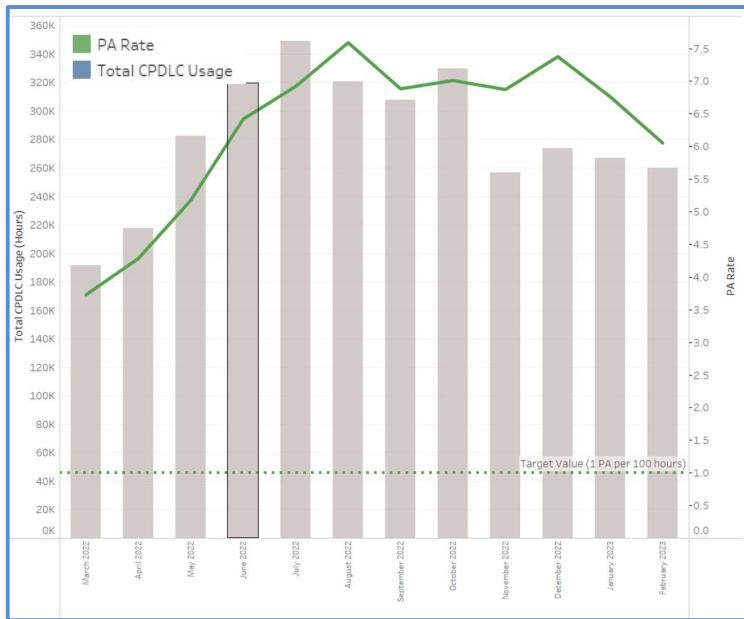


Figure 2-1: PA rate

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>.

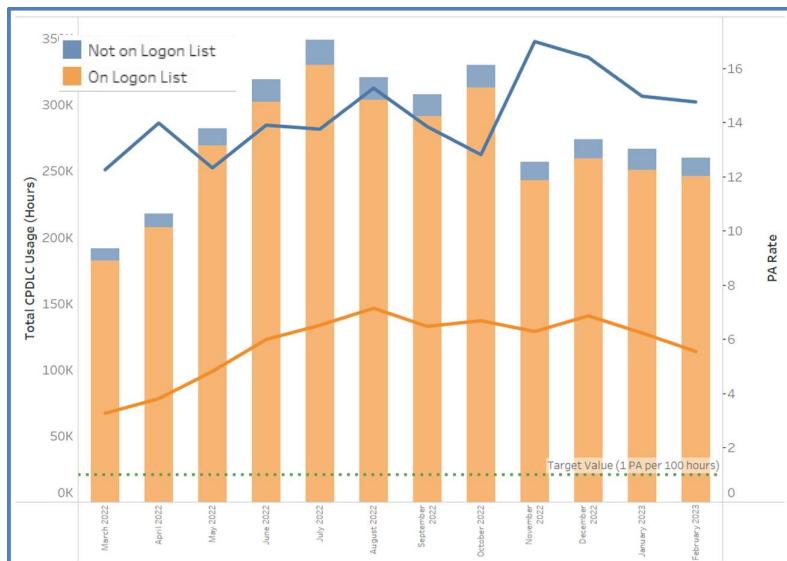


Figure 2-2: Logon Listed Aircraft PA rate

## 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	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023
EDUU	2.3	2.1	2.5	2.6	2.5	2.0	2.4	1.9	1.4	1.6	1.1	1.5
EDYY	2.4	2.9	3.5	3.7	3.0	2.7	3.2	2.8	2.4	2.7	1.9	2.1
EETT											2.5	0.8
EGPX	5.8	6.5	6.0	6.3	5.7	7.0	7.1	6.0	5.5	5.8	4.9	5.1
EGTT	3.1	3.7	3.8	3.7	4.0	4.1	4.9	3.7	3.4	4.3	3.6	3.7
EISN										41.2	55.2	49.7
EKDK	7.6	9.1	9.2	7.0	6.3	6.6	6.6	7.8	7.3	7.7	8.4	8.6
EPWW	2.0	2.2	2.6	4.8	3.6	2.6	3.1	2.7	3.6	3.3	5.7	3.2
ESMM	2.0	2.0	2.9	3.3	2.8	2.4	2.2	2.8	2.5	2.7	2.3	2.8
ESOS	3.7	4.5	6.5	4.5	3.8	4.1	5.9	8.9	4.9	5.2	3.6	4.2
EVRR	3.1	3.9	2.9	3.6	2.8	4.5	3.3	3.5	3.5	5.3	3.2	3.0
EYVC											2.3	2.4
GCCC	40.9	41.9	40.8	49.1	45.1	47.6	44.0	18.2	40.3	44.9	48.1	49.0
LDZO	8.1	8.1	9.1	11.8	19.3	12.2	11.4	10.6	7.3	6.5	5.2	5.3
LECB	4.3	4.0	4.8	4.5	4.9	7.8	10.7	3.8	3.5	2.6	2.7	2.8
LECM	4.5	4.7	4.6	4.9	4.9	5.3	5.4	4.8	7.3	6.5	4.9	6.6
LFBB	1.4	1.3	1.3	1.4	1.6	2.8	3.7	1.4	1.5	1.9	1.2	1.3
LFEE	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LFFF	3.5	3.0	5.0	3.5	2.9	4.2	4.3	4.7	4.5	4.7	4.2	4.4
LFMM	7.0	4.0	7.4	8.3	13.1	10.3	7.5	7.1	6.3	1.0	0.0	0.0
LFRR	1.5									1.7	1.9	1.8
LHCC	4.8	5.2	5.9	4.8	4.9	4.0	4.2	3.2	3.7	3.8	4.6	4.0
LIBB	21.1	23.3	43.9	82.1	143.1	167.5	156.3	122.3	76.9	74.1	65.1	49.2
LIMM	10.9	15.9	43.9	86.8	158.4	216.9	181.3	319.8	204.1	237.0	234.8	105.8
LIPP	15.3	17.3	61.6	155.7	95.3	425.6	357.4	518.8	311.4	429.0	442.1	270.1
LIRR	10.2	14.6	24.8	53.2	152.0	61.2	52.3	66.0	51.3		56.4	29.5
LJLA	5.4	5.8	6.6	7.7	7.6	8.6	7.9	9.8	4.2	5.2	5.2	5.1
LKAA	6.2	5.8	5.7	5.9	5.2	4.2	3.8	4.1	4.2	4.4	5.0	4.6
LOVV	4.7	5.3	6.1	6.1	7.0	6.1	5.3	5.2	4.3	4.2	4.3	4.5
LPPC								25.1	33.8	50.6	31.9	24.7
LRBB	3.8	2.7	3.1	3.7	4.1	3.9	4.5	3.1	3.7	3.4	3.5	3.8
LSAG	2.7	2.8	4.6	6.1	16.2	5.0	4.6	4.4	4.7	2.3	3.4	3.2
LSAZ	2.4	2.6	3.1	5.8	15.5	4.2	4.1	4.5	3.2	2.8	2.1	2.2

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 A0s
RYR	51595.68	41038	6.6
WZZ	18174.65	14600	2.3
EZY	12609.72	11056	5.1
DLH	10954.34	11866	5.1
THY	9662.39	6582	4.7
BAW	9372.43	8035	6.0
TAP	8171.23	6802	17.8
AFR	7808.56	9733	4.5
EJU	6934.19	7791	11.2
SAS	6439.57	6341	3.4
EXS	6355.10	3242	10.5
VLG	6158.02	7498	6.9
FIN	5199.11	2714	5.6
EWG	4855.85	4347	4.8
PGT	4798.77	3032	6.2
IBE	3473.30	3834	3.7
WUK	3427.77	1766	4.1
NOZ	3366.25	2139	4.5
SWR	3243.97	3714	5.4
KLM	3231.17	3540	3.4
TRA	3218.56	2242	2.0
NSZ	3081.98	1948	3.8
AUA	2915.58	3422	3.9
EIN	2721.85	2985	5.8
RAM	2706.33	1759	4.7
BTI	2635.27	1672	2.7
BEL	2399.50	2762	2.1
EZS	2052.89	2441	13.6
LOT	1470.58	1816	13.7
IBS	1446.89	1836	7.7

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.

Vdr Make	Vdr Model	Cmu Make	Cmu Model	February 2022	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	
Garmin	GDR66	Garmin	GIA63W	4.21	6.04	8.36	11.61	12.19	18.89	14.65	12.27	8.57	7.22	9.58	7.64	8.83	
			GIA64E	3.89	3.03	9.01	9.94	13.45	17.18	14.44	15.77	8.58	6.03	6.94	3.32	2.76	
Honeywell	EPIC VDR	Honeywell	EPIC CMF	11.09	6.95	6.67	10.58	11.45	12.27	11.04	9.38	7.23	4.91	4.47	4.88	5.18	
	KTR2280A	Honeywell	EPIC CMF	1.26	6.21	3.80	7.07	6.82	6.69	12.76	10.49	5.39	10.75	5.10	4.74	7.79	
	RTA44D	Airbus	FANS-B+	2.28	2.37	3.20	4.49	6.96	7.95	8.16	7.25	8.14	5.27	6.17	5.25	4.10	
		Honeywell	Mk2+	1.72	2.52	2.65	1.76	2.58	2.82	1.65	1.65	1.46	2.67	5.03	3.10	3.25	
		Rockwell Collins	CMU900	0.97	3.80	5.34	6.46	9.08	13.12	7.39	7.10	3.39	4.75	5.67	4.04	3.59	
	RTA50D	Airbus	FANS-A+B								2.14	0.83	0.00	5.37	3.36		
Rockwell Collins	920	Airbus	FANS-B+	2.29	2.62	3.06	4.33	6.51	7.63	8.78	6.69	7.68	6.09	6.66	5.54	4.59	
			FANS-C	2.51	2.87	2.74	5.59	6.05	7.45	7.67	6.50	7.04	7.49	8.85	7.18	5.68	
		Honeywell	777 AIMS2	48.53	56.06	40.11	38.44	35.18	32.04	16.89	31.69	17.71	23.65	18.62	30.52	65.53	
			Mk2+	4.17	3.99	4.50	4.57	4.61	4.95	4.72	5.28	5.99	6.23	6.27	5.98	5.94	
	2100	Airbus	CMU900	1.73	4.68	2.24	8.48	9.24	30.76	3.94							
			FANS-A+B	3.43	3.20	3.36	5.36	9.44	9.07	11.51	8.84	8.29	6.78	7.98	7.82	7.19	
			FANS-B+	0.71	3.82	0.95	2.91	4.57	3.73	9.84	10.41	9.69	5.83	6.48	9.30	7.97	
	2200	Airbus	CMU900	2.86	7.27	4.41	5.70	11.72	11.10	7.28	7.53	16.07	3.13	4.20	7.34	7.47	
			FANS-C	2.48	3.93	3.61	6.14	6.93	5.82	7.46	6.95	6.10	6.36	5.08	4.32	4.61	
			FANS-B+	2.23	2.27	2.81	4.79	6.59	7.26	9.60	7.54	8.01	6.34	6.21	5.47	4.35	
			FANS-C	1.86	2.18	5.25	4.19	3.77	6.29	2.40	2.46	3.11	4.79	7.89	5.55	4.89	
			Honeywell	3.67	4.33	5.13	5.34	5.67	5.89	5.44	5.83	4.52	5.03	6.09	9.50	8.99	
4000	Rockwell Collins	CMU900	Mk2+	1.88	1.83	2.79	1.87	2.25	2.83	1.57	1.48	1.26	1.91	2.20	2.26	2.07	
			RIU-4010	3.39	3.16	4.39	3.93	4.02	4.04	3.82	4.05	3.93	7.10	8.44	7.20	5.67	
			CMU4000	3.80	3.34	2.84	3.75	3.60	3.92	4.72	5.25	3.99	4.22	5.07	5.09	4.97	
			RIU-4000	4.56	3.11	3.87	4.55	6.01	5.32	10.19	9.23	7.70	5.98	7.49	5.43	4.84	
			RIU-4010	2.71	2.38	2.81	3.43	4.51	4.29	5.64	5.74	6.54	12.75	16.58	14.33	10.01	
Spectralux	Dlink+	Spectralux	Dlink+			9.58	11.77	9.80	9.05	11.15	11.50	12.54	18.07	20.14	22.64	18.33	
Thales	EVR750	Airbus	FANS-A+B			4.87	3.87	4.64	7.23	10.59	8.37	10.02	9.79	9.17	6.80	7.50	3.50
UASC	UL801	UASC	UL801	9.43	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.

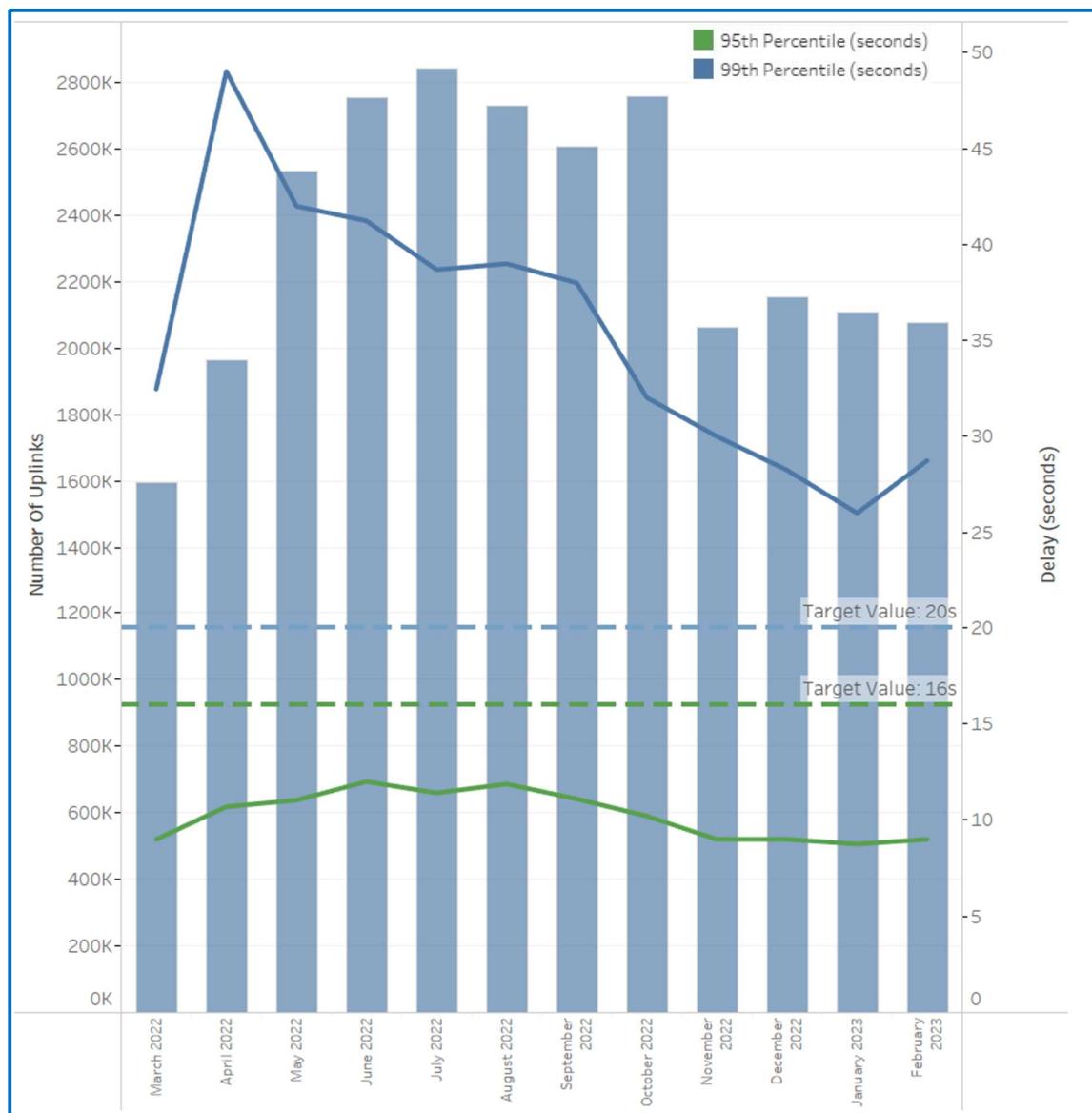


Figure 2-6: Technical Round Trip Delay

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

Atsu Code	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023
EDUU	8.1	9.5	10.5	11.2	11.3	11.1	10.8	10.2	8.3	8.4	8.1	8.4
EDYY	7.7	9.2	9.9	10.3	10.2	10.1	10.2	9.9	8.2	8.3	7.9	8.3
EETT											6.0	6.0
EGPX	8.0	9.0	9.7	10.0	10.0	9.8	10.0	9.1	7.9	8.1	7.7	8.0
EGTT	8.0	9.3	9.8	9.8	9.7	9.6	9.9	9.4	8.1	8.2	7.9	8.5
EISN									38.0	19.6	20.9	
EKDK	8.0	9.0	9.0	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0	8.0
EPWW	5.7	6.2	6.4	6.8	6.8	6.8	7.2	6.7	6.6	6.4	6.6	6.4
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	6.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
EVRR	8.0	9.0	10.0	9.0	9.0	9.0	8.0	8.0	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
GCCC	25.1	10.5	38.5	37.6	22.8	31.1	22.4	7.9	12.2	14.2	14.2	11.6
LDZO	10.0	11.0	13.0	13.0	13.0	14.0	14.0	12.0	11.0	10.0	10.0	10.0
LECB	8.8	8.7	8.5	9.2	9.4	9.5	9.2	8.3	7.8	7.7	7.8	8.1
LECM	7.8	8.1	7.8	8.4	8.3	8.4	8.2	8.2	8.8	8.5	8.5	9.0
LFBB	7.0	8.0	9.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	6.0	7.0
LFEE	10.0	8.0	9.0	10.0	10.0	10.0	10.0	9.0	8.0	8.0	8.0	8.0
LFFF	10.0	12.0	13.0	14.0	15.0	15.0	15.0	14.0	12.0	12.0	11.0	11.0
LFMM	9.0	10.0	11.0	10.0	11.0	11.0	10.0	9.0	8.0	6.0	6.0	6.0
LFRR	8.0		9.0	9.0	9.0	9.0	9.0	8.0	7.0	8.0	7.0	8.0
LHCC	8.0	9.0	9.0	10.0	10.0	11.0	10.0	9.0	8.0	9.0	9.0	8.0
LIBB	14.3	16.2	18.0	24.4	17.9	24.6	29.8	23.7	14.9	14.0	13.6	13.6
LIMM	37.3	48.8	70.6	78.7	87.6	79.6	54.6	73.5	41.6	37.6	29.8	37.7
LIPP	27.9	42.5	69.6	83.9	85.4	67.5	49.7	59.0	40.9	37.7	36.8	84.9
LIRR	24.3	37.8	29.9	37.5	39.5	45.7	37.6	24.5	15.7		14.6	15.5
LJLA	12.5	14.2	15.8	18.2	18.9	18.9	17.9	16.3	13.4	12.9	12.8	13.4
LKAA	8.0	10.0	11.0	11.7	12.0	11.0	11.0	11.0	10.0	10.0	9.0	9.0
LOVV	10.0	11.0	13.0	13.0	13.0	13.0	13.0	12.0	10.0	10.0	10.0	10.0
LPPC							33.5	37.9	56.4	33.6	19.2	
LRBB	6.6	6.7	7.3	7.9	8.2	8.3	8.4	7.5	7.3	7.1	7.6	7.3
LSAG	10.0	11.0	13.0	13.8	13.8	15.1	14.3	11.9	10.2	10.5	10.5	10.5
LSAZ	11.0	13.0	14.0	16.0	16.1	16.7	16.1	14.4	11.7	11.6	11.0	12.0

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

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

Atsu Code	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023
EDUU	37.3	39.3	42.0	45.4	42.2	40.5	39.6	27.7	21.3	21.7	21.5	21.6
EDYY	22.1	28.8	31.3	30.1	27.1	27.1	27.2	25.5	21.5	21.8	20.9	21.2
EETT											14.0	17.0
EGPX	22.3	37.4	38.5	38.0	29.1	37.5	35.5	23.3	19.6	20.1	18.5	19.8
EGTT	21.9	24.7	24.6	24.1	23.2	23.3	24.8	22.6	21.7	21.9	21.5	21.9
EISN									184.7	152.4	108.6	
EKDK	18.0	18.0	21.0	24.0	21.0	21.0	21.0	20.0	18.0	19.0	18.0	18.0
EPWW	13.3	14.9	14.0	21.6	21.9	21.3	22.0	16.0	21.1	16.6	21.4	15.2
ESMM	12.0	13.0	13.0	14.0	13.0	14.0	14.0	13.0	13.0	13.0	13.0	12.0
ESOS	13.0	14.0	14.0	15.0	13.0	15.0	14.0	13.0	12.0	13.0	12.0	12.0
EVRR	37.0	37.0	39.0	38.0	31.0	37.0	36.1	17.0	16.0	15.0	16.0	16.0
EYVC		13.0	16.7	14.0	17.2	11.9	12.0	9.0	9.0	10.0	9.0	10.0
GCCC	140.3	83.6	107.2	86.5	64.1	91.7	89.2	35.5	88.0	107.6	65.9	87.1
LDZO	32.0	29.0	34.0	35.0	34.0	37.0	37.0	32.0	28.0	27.0	25.0	28.0
LECB	26.2	23.1	22.2	23.3	22.7	24.6	23.2	21.1	19.8	18.7	21.8	24.0
LECM	38.2	38.1	24.3	38.8	29.0	28.3	29.7	27.8	43.4	39.8	38.6	44.3
LFBB	14.0	14.0	16.0	16.0	18.0	18.0	17.0	15.0	14.0	14.0	14.0	15.0
LFEE	19.0	18.0	19.0	21.0	22.0	21.0	22.0	20.0	17.0	17.0	17.0	17.0
LFFF	21.0	24.0	26.0	34.0	39.0	37.0	38.0	34.0	30.0	29.0	25.0	26.0
LFMM	23.0	24.0	24.0	29.0	37.0	38.0	36.0	30.0	24.0	15.0	15.0	17.0
LFRR	15.0		17.0	19.0	23.0	21.0	21.0	20.0	18.0	18.0	18.0	18.0
LHCC	17.0	18.0	20.0	23.0	26.0	26.0	26.0	19.0	16.0	17.0	18.0	17.0
LIBB	316.9	279.5	97.1	98.8	87.1	133.7	181.6	106.0	86.4	85.7	78.4	85.1
LIMM	181.4	184.3	184.5	185.5	194.2	191.7	185.5	190.1	184.2	182.3	181.0	182.2
LIPP	180.6	182.5	186.1	191.0	187.6	191.9	183.2	189.4	183.9	186.4	181.8	184.6
LIRR	491.7	385.0	181.8	181.8	182.5	185.8	181.8	181.5	94.0		90.7	100.5
LJLA	38.6	43.6	47.0	60.5	60.5	64.1	57.6	55.2	35.2	28.3	31.4	37.6
LKAA	23.0	33.0	34.0	37.0	38.0	33.0	35.0	32.0	29.0	26.2	29.0	25.0
LOVV	37.0	37.0	38.0	38.0	37.0	37.0	37.0	32.0	23.0	28.0	28.0	25.0
LPPC								181.1	183.0	186.8	181.9	112.2
LRBB	29.7	21.9	23.2	22.8	25.0	29.9	35.9	21.9	22.4	22.7	22.8	25.1
LSAG	27.0	38.0	41.0	46.5	43.5	52.3	46.1	32.7	26.5	28.5	27.3	28.3
LSAZ	33.0	47.0	54.4	69.0	62.1	62.9	54.1	47.7	30.8	31.6	27.2	33.0

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

## Overall 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

## Technical Continuity per Centre

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

Atsu	February 2022	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	
EDUU	0.988	0.986	0.984	0.983	0.982	0.982	0.984	0.984	0.988	0.991	0.990	0.991	0.990	
EDYY	0.989	0.989	0.986	0.985	0.985	0.987	0.986	0.986	0.988	0.990	0.990	0.991	0.989	
EETT												0.993	0.994	
EGPX	0.987	0.987	0.984	0.983	0.983	0.985	0.983	0.983	0.988	0.991	0.991	0.991	0.991	
EGTT	0.991	0.990	0.988	0.988	0.988	0.989	0.989	0.987	0.990	0.991	0.990	0.991	0.991	
EISN												0.842	0.876	0.874
EKDK	0.987	0.988	0.987	0.986	0.986	0.987	0.987	0.987	0.987	0.989	0.987	0.989	0.988	
EPWW	0.993	0.993	0.991	0.992	0.989	0.989	0.990	0.989	0.991	0.989	0.990	0.987	0.990	
ESMM	0.991	0.994	0.993	0.991	0.991	0.992	0.992	0.991	0.994	0.993	0.992	0.994	0.993	
ESOS	0.980	0.984	0.985	0.987	0.985	0.988	0.986	0.988	0.990	0.991	0.990	0.990	0.989	
EVRR	0.977	0.977	0.977	0.976	0.977	0.980	0.980	0.978	0.986	0.987	0.988	0.986	0.989	
EYVC		0.992	0.992	0.993	0.992	0.995	0.995	0.993	0.994	0.994	0.994	0.994	0.992	
GCCC	0.892	0.880	0.902	0.859	0.865	0.888	0.879	0.876	0.965	0.916	0.903	0.906	0.913	
LDZO	0.970	0.974	0.976	0.971	0.968	0.965	0.963	0.965	0.970	0.976	0.978	0.981	0.978	
LECB	0.980	0.984	0.986	0.988	0.986	0.987	0.985	0.983	0.990	0.990	0.990	0.990	0.987	
LECM	0.980	0.981	0.982	0.984	0.981	0.983	0.982	0.982	0.984	0.978	0.980	0.981	0.979	
LFBB	0.974	0.974	0.975	0.974	0.913	0.867	0.864	0.862	0.868	0.865	0.871	0.871	0.863	
LFEE	0.988	0.984	0.890	0.892	0.894	0.891	0.890	0.890	0.893	0.898	0.892	0.892	0.886	
LFFF	0.955	0.952	0.949	0.949	0.850	0.773	0.778	0.780	0.777	0.817	0.889	0.888	0.886	
LFMM	0.949	0.946	0.952	0.950	0.891	0.843	0.845	0.842	0.848	0.847	0.864	0.864	0.855	
LFRR	0.972	0.970		0.969	0.907	0.866	0.867	0.868	0.874	0.875	0.883	0.885	0.881	
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	
LIBB	0.959	0.963	0.954	0.954	0.938	0.902	0.945	0.941	0.945	0.960	0.965	0.961	0.967	
LIMM	0.949	0.951	0.939	0.930	0.927	0.857	0.927	0.927	0.857	0.886	0.890	0.898	0.923	
LIPP	0.955	0.957	0.939	0.923	0.912	0.880	0.912	0.921	0.827	0.844	0.812	0.804	0.893	
LIRR	0.951	0.948	0.946	0.950	0.933	0.838	0.932	0.938	0.940	0.952		0.959	0.962	
LJLA	0.975	0.979	0.976	0.971	0.964	0.962	0.961	0.964	0.970	0.984	0.984	0.986	0.982	
LKAA	0.991	0.990	0.987	0.985	0.983	0.983	0.987	0.986	0.988	0.989	0.989	0.989	0.988	
LOVV	0.967	0.971	0.971	0.967	0.965	0.968	0.969	0.968	0.975	0.982	0.979	0.978	0.977	
LPPC									0.928	0.920	0.902	0.937	0.953	
LRBB	0.988	0.985	0.988	0.987	0.985	0.985	0.985	0.984	0.988	0.987	0.987	0.985	0.986	
LSAG	0.987	0.986	0.982	0.982	0.981	0.980	0.980	0.980	0.986	0.988	0.988	0.988	0.987	
LSAZ	0.989	0.986	0.981	0.980	0.975	0.974	0.977	0.980	0.983	0.989	0.988	0.990	0.988	

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

Atsu	February 2022	March 2022	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023
EDUU	0.9835	0.9804	0.9776	0.9755	0.9726	0.9735	0.9752	0.9757	0.9803	0.9868	0.9857	0.9866	0.9852
EDYY	0.9841	0.9837	0.9789	0.9774	0.9769	0.9784	0.9782	0.9778	0.9798	0.9846	0.9839	0.9860	0.9835
EETT												0.9904	0.9910
EGPX	0.9837	0.9831	0.9793	0.9766	0.9764	0.9778	0.9767	0.9766	0.9826	0.9864	0.9871	0.9870	0.9865
EGTT	0.9865	0.9843	0.9806	0.9801	0.9807	0.9814	0.9812	0.9796	0.9824	0.9848	0.9840	0.9852	0.9840
EISN											0.8340	0.8705	0.8690
EKDK	0.9851	0.9861	0.9849	0.9831	0.9820	0.9836	0.9830	0.9834	0.9840	0.9861	0.9849	0.9870	0.9850
EPWW	0.9900	0.9897	0.9880	0.9893	0.9845	0.9849	0.9859	0.9844	0.9877	0.9847	0.9866	0.9832	0.9873
ESMM	0.9893	0.9928	0.9912	0.9896	0.9894	0.9913	0.9903	0.9895	0.9927	0.9923	0.9910	0.9926	0.9919
ESOS	0.9786	0.9828	0.9846	0.9864	0.9837	0.9875	0.9853	0.9865	0.9894	0.9904	0.9887	0.9895	0.9883
EVRR	0.9740	0.9739	0.9745	0.9732	0.9732	0.9754	0.9768	0.9750	0.9843	0.9855	0.9866	0.9850	0.9864
EYVC			0.9904	0.9892	0.9901	0.9892	0.9932	0.9923	0.9941	0.9934	0.9935	0.9934	0.9917
GCCC	0.8783	0.8721	0.8959	0.8515	0.8548	0.8804	0.8726	0.8642	0.9605	0.9111	0.8979	0.9000	0.9067
LDZO	0.9650	0.9682	0.9685	0.9627	0.9578	0.9553	0.9519	0.9543	0.9618	0.9700	0.9728	0.9762	0.9730
LECB	0.9750	0.9780	0.9808	0.9829	0.9807	0.9815	0.9783	0.9770	0.9848	0.9853	0.9858	0.9848	0.9813
LECM	0.9761	0.9769	0.9774	0.9803	0.9762	0.9781	0.9768	0.9776	0.9790	0.9729	0.9753	0.9762	0.9729
LFBB	0.9729	0.9719	0.9737	0.9717	0.9099	0.8646	0.8615	0.8595	0.8661	0.8633	0.8693	0.8696	0.8613
LFEE	0.9842	0.9795	0.8873	0.8881	0.8880	0.8848	0.8841	0.8841	0.8876	0.8943	0.8884	0.8888	0.8828
LFFF	0.9513	0.9478	0.9428	0.9411	0.8411	0.7639	0.7692	0.7709	0.7690	0.8108	0.8832	0.8826	0.8806
LFMM	0.9462	0.9428	0.9463	0.9440	0.8859	0.8374	0.8402	0.8366	0.8443	0.8441	0.8621	0.8621	0.8529
LFRR	0.9698	0.9674		0.9652	0.9036	0.8613	0.8634	0.8646	0.8709	0.8715	0.8803	0.8824	0.8780
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	0.9551	0.9572	0.9477	0.9457	0.9267	0.8946	0.9344	0.9314	0.9358	0.9556	0.9608	0.9578	0.9631
LIMM	0.9429	0.9461	0.9306	0.9201	0.9157	0.8452	0.9165	0.9158	0.8500	0.8806	0.8850	0.8932	0.9171
LIPP	0.9476	0.9496	0.9295	0.9105	0.8987	0.8680	0.8953	0.9074	0.8176	0.8376	0.8058	0.7995	0.8867
LIRR	0.9456	0.9434	0.9394	0.9427	0.9240	0.8272	0.9197	0.9291	0.9340	0.9476		0.9548	0.9573
LJLA	0.9705	0.9727	0.9679	0.9591	0.9485	0.9449	0.9438	0.9489	0.9581	0.9777	0.9778	0.9797	0.9739
LKAA	0.9898	0.9888	0.9853	0.9827	0.9806	0.9797	0.9839	0.9835	0.9864	0.9878	0.9879	0.9878	0.9872
LOVV	0.9637	0.9672	0.9665	0.9599	0.9570	0.9601	0.9608	0.9598	0.9687	0.9778	0.9749	0.9746	0.9730
LPPC									0.9222	0.9135	0.8947	0.9311	0.9479
LRBB	0.9852	0.9810	0.9838	0.9826	0.9796	0.9797	0.9797	0.9790	0.9839	0.9826	0.9827	0.9807	0.9808
LSAG	0.9833	0.9816	0.9751	0.9726	0.9707	0.9705	0.9680	0.9686	0.9786	0.9821	0.9825	0.9829	0.9812
LSAZ	0.9839	0.9806	0.9725	0.9697	0.9627	0.9623	0.9637	0.9668	0.9730	0.9820	0.9819	0.9847	0.9812

Figure 2-10: Technical Continuity per Centre

### 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.

#### 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.

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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.

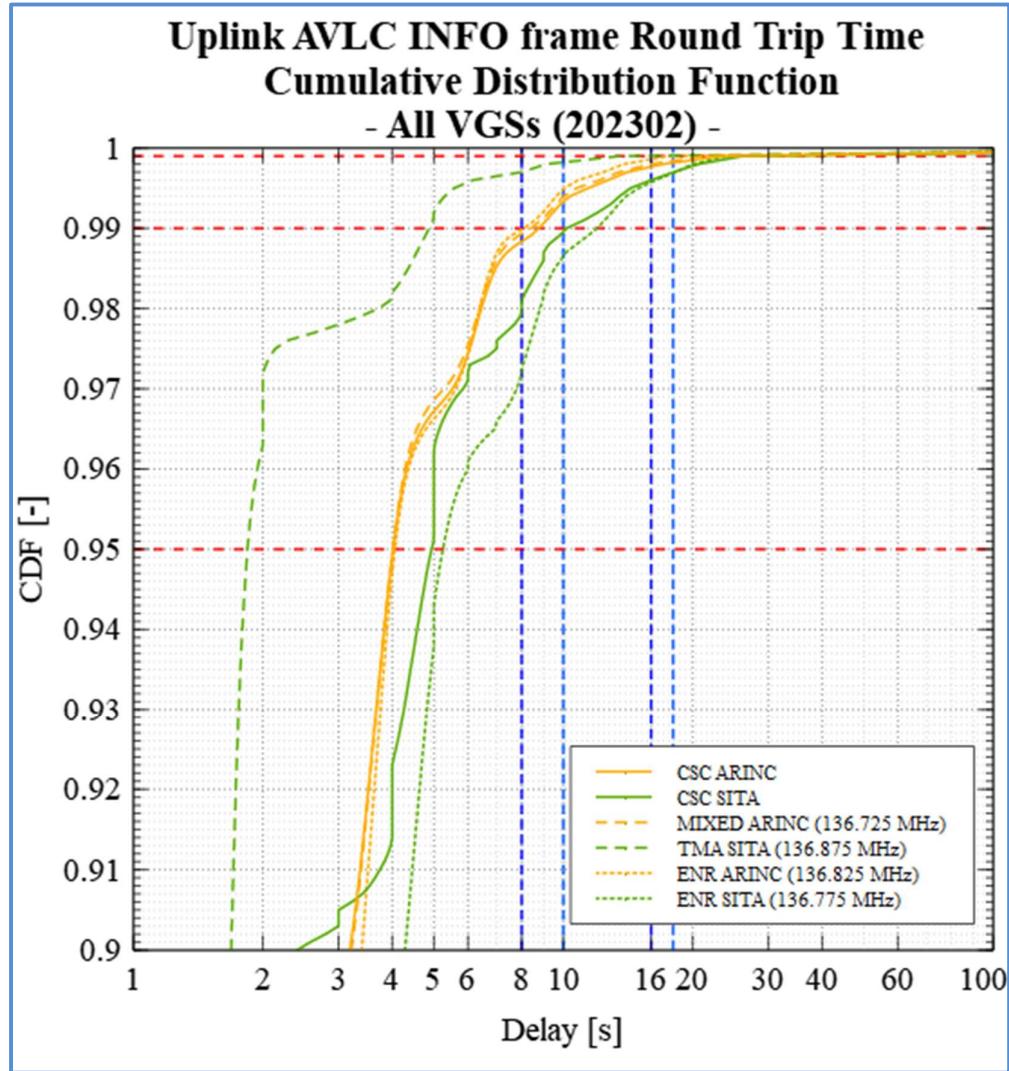


Figure 3-1: AVLC Round Trip Time

## 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.

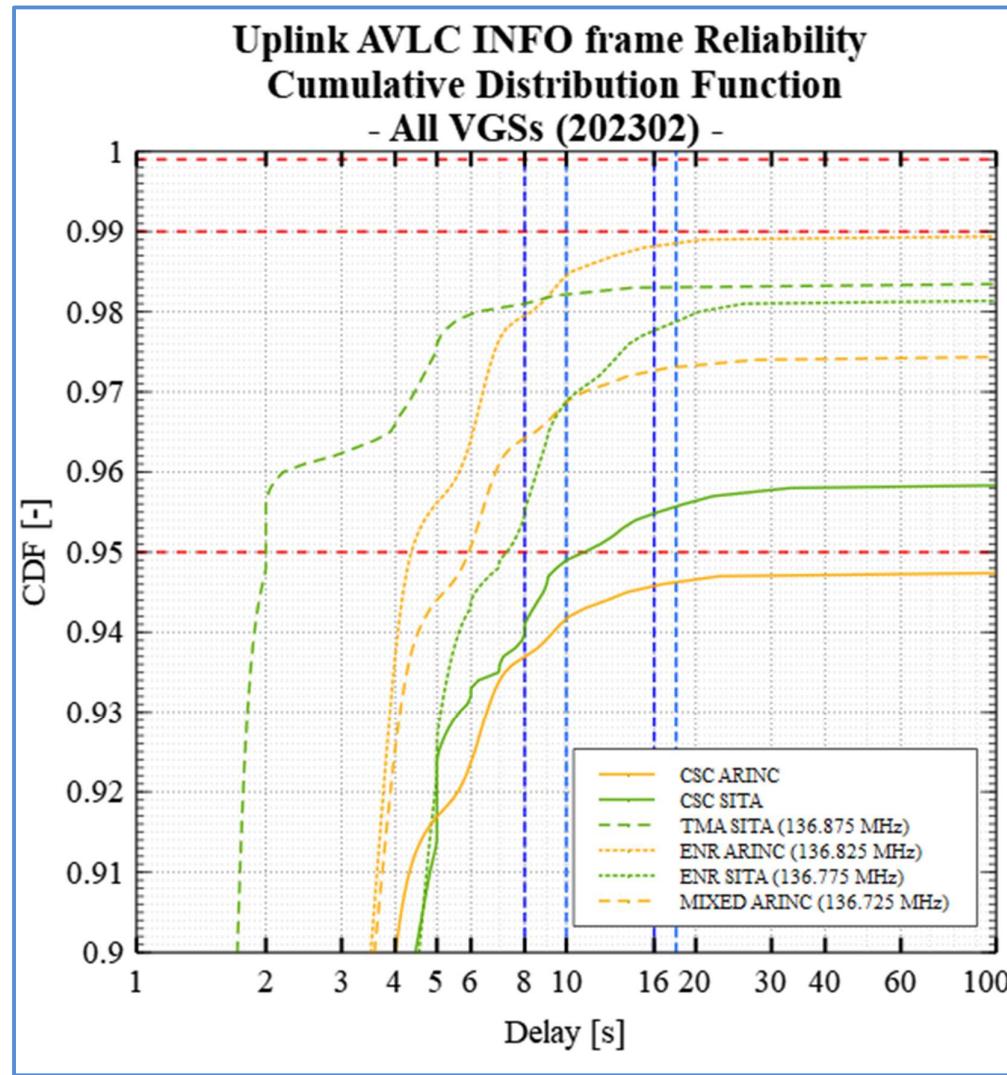


Figure 3-2: AVLC Reliability

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.

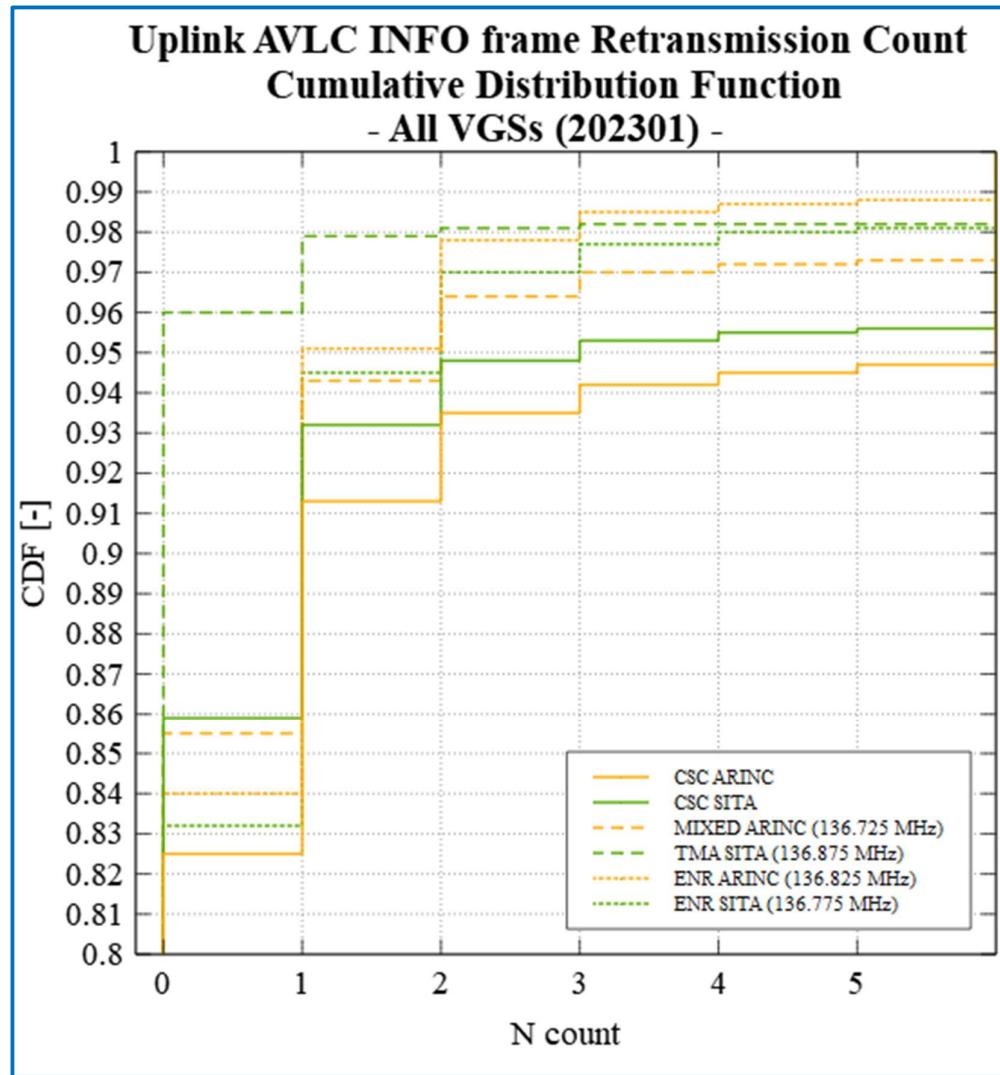


Figure 3-3: AVLc Uplink INFO frame retransmission count

## 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).

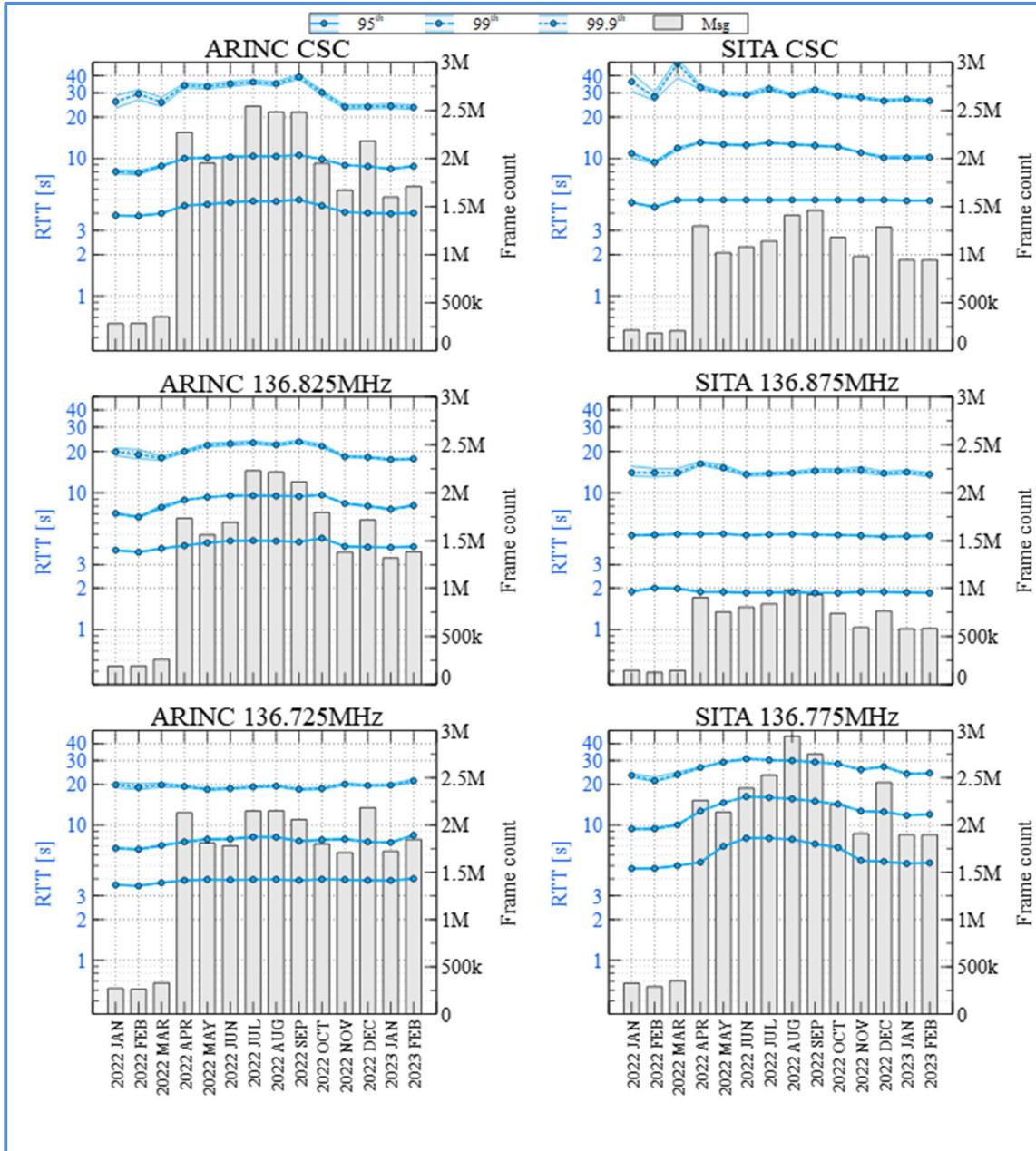


Figure 3-4: AVLC Uplink INFO Round Trip Time per Frequency

## 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 shows 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).

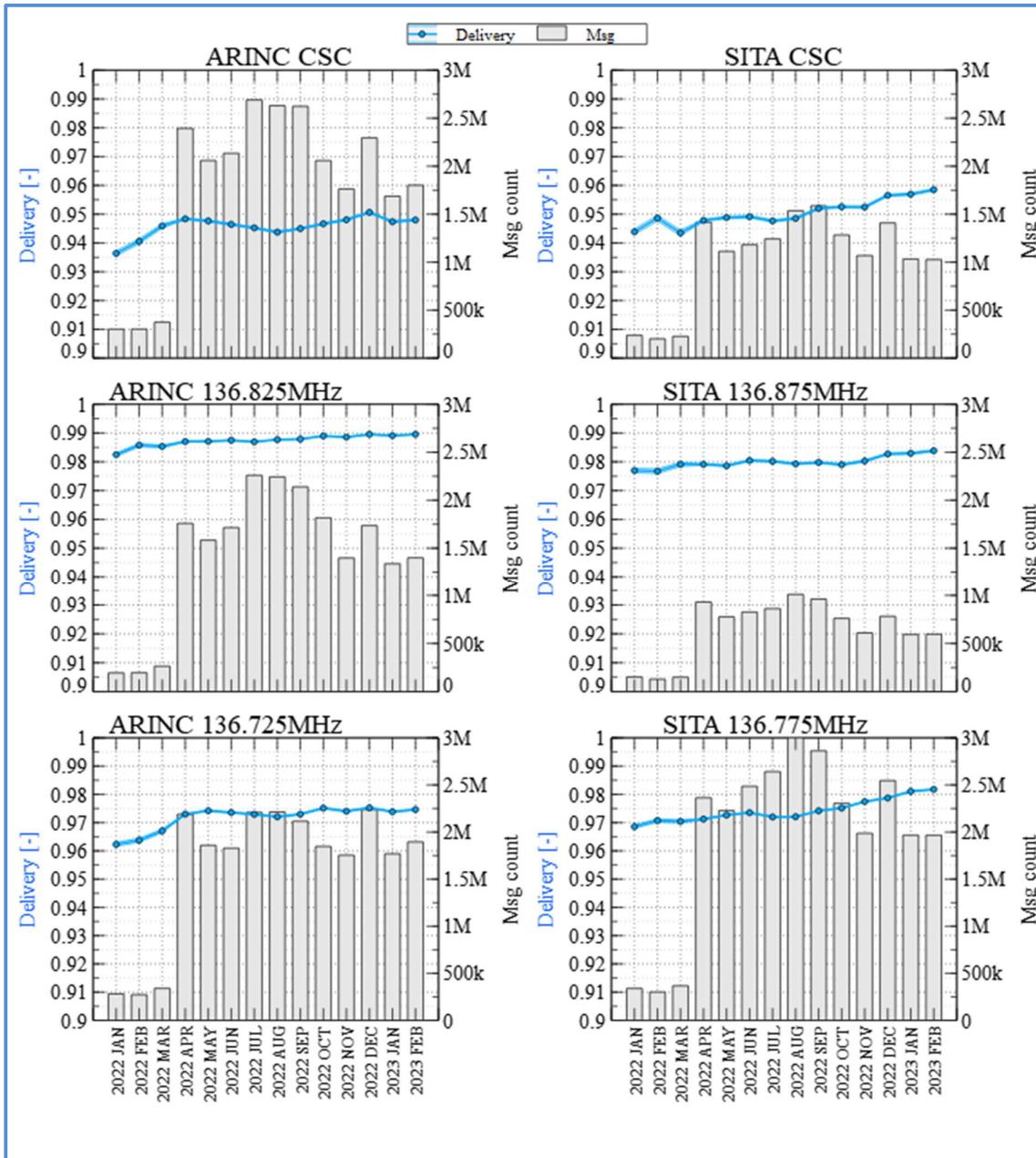


Figure 3-5: AVLC successful delivery rate per frequency

## 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 shows 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).

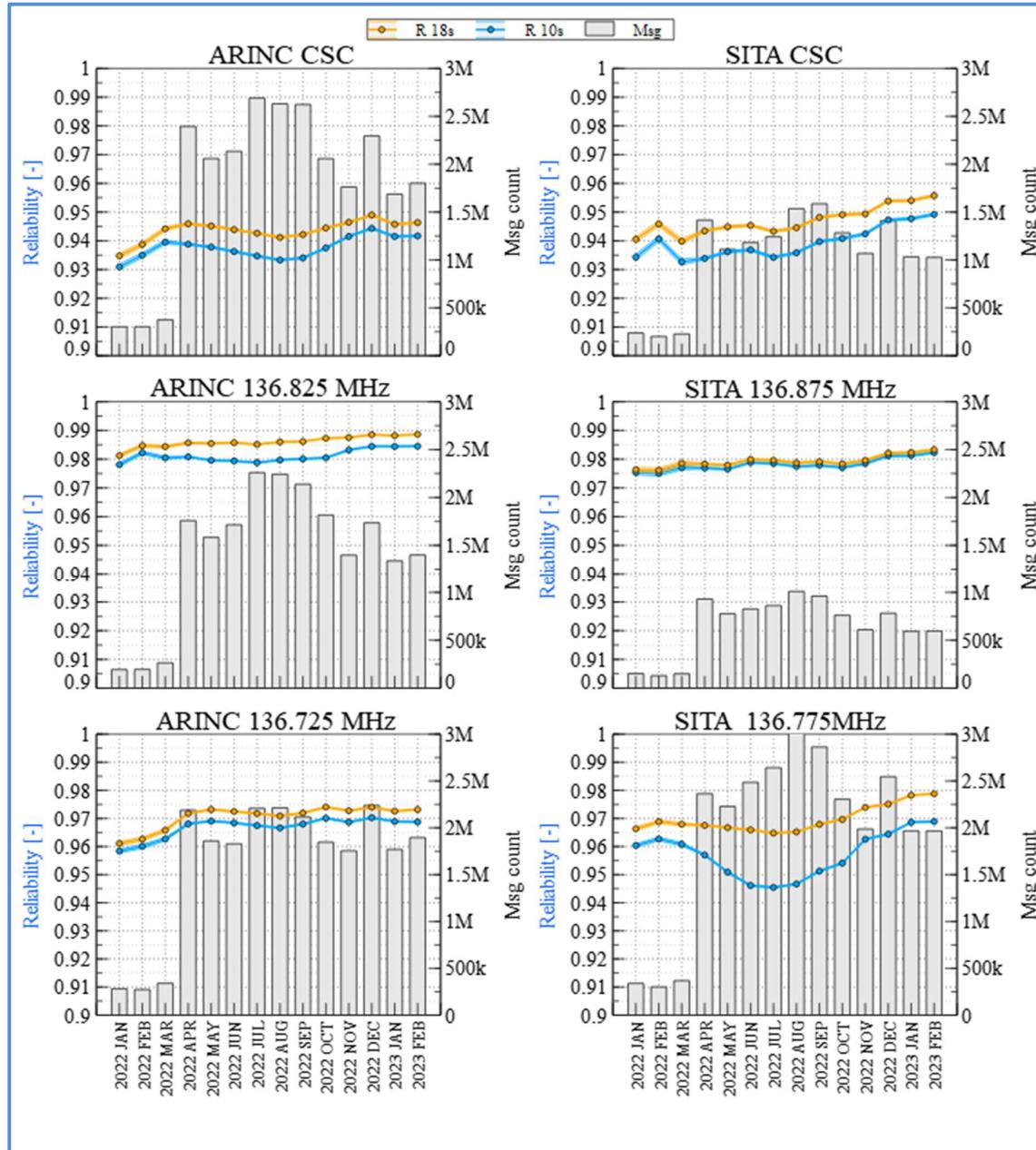


Figure 3-6: AVLC Reliability per frequency

## 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.

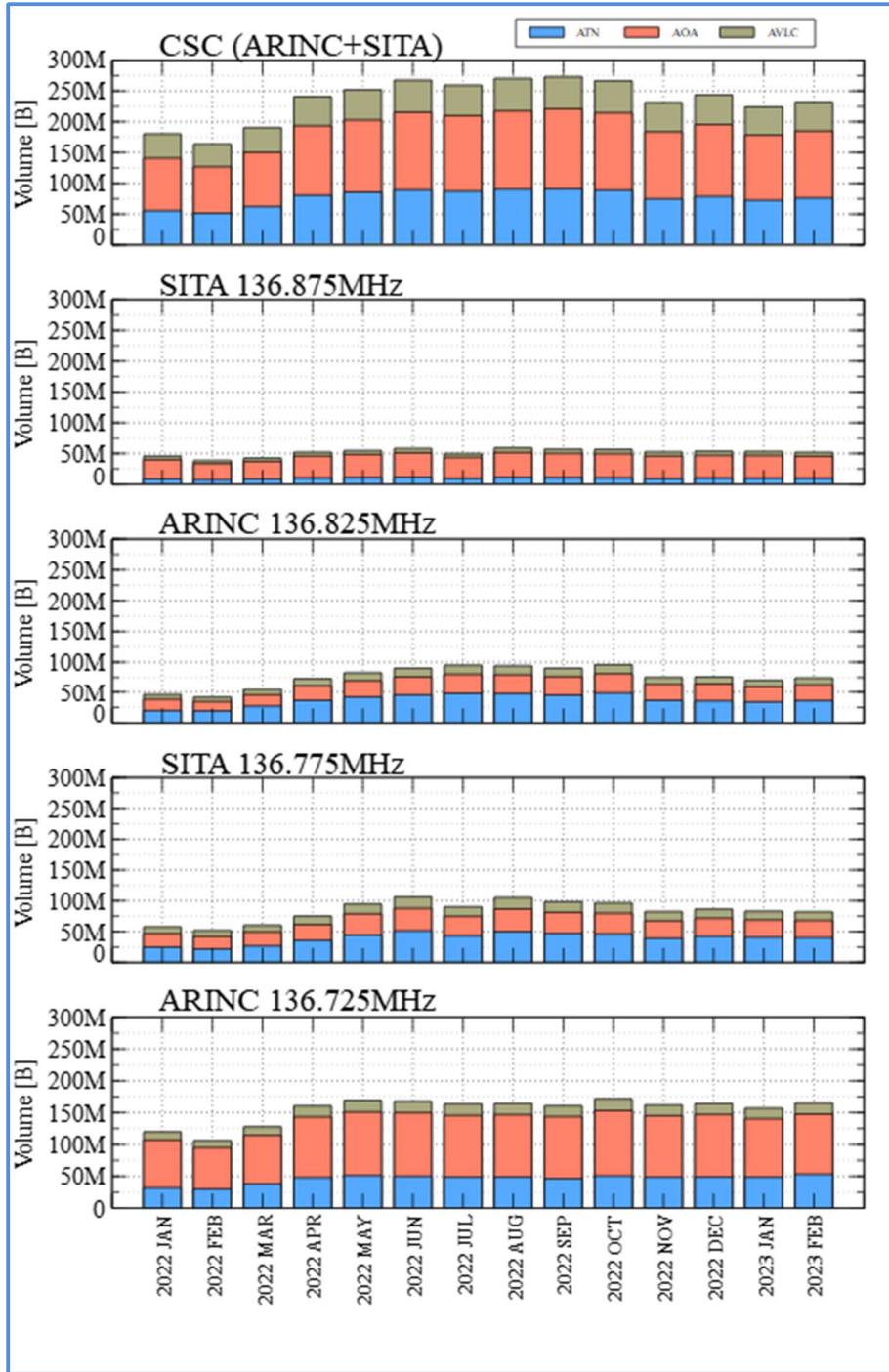


Figure 3-7: Daily average AVLC Channel load per frequency

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

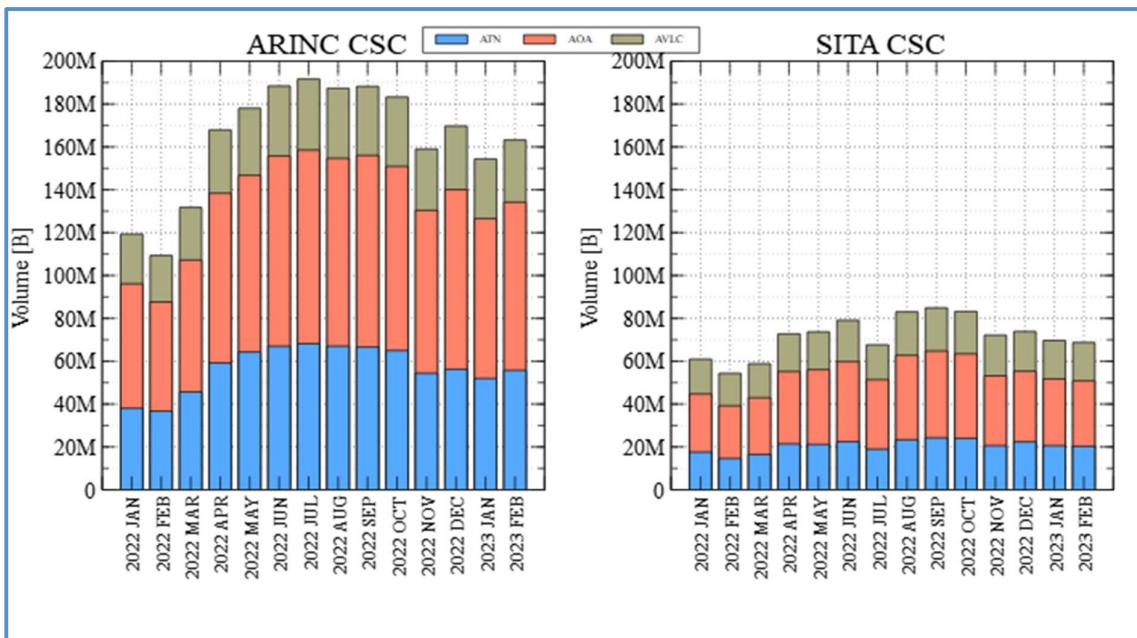


Figure 3-8: Daily average AVLC load on the CSC

## 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 15 March 2023, may be different in subsequent months if additional data is uploaded by the ANSPs.

	EDUU	EDYY	EETT	EGPX	EGTT	EISN	EKDK	EPMW	ESMM	ESOS	EVRR	EYVC	GCCC	LDZO	LECB	LECM	LFBB	LFEE	LFFF	LFMM	LFRR	LHCC	LBB	LIMM	LIPP	LIRR	LJAA	LOWV	LPCC	LRBB	LSAG	LSAZ	
1 February 2023	1.535	1.844	86	373	2.305	160	591	522	511	252	122	79	90	443	741	1.456	878	749	838	743	987	726	102	73	70	250	401	924	719	614	394	384	
2 February 2023	1.670	1.913	81	536	2.578	157	607	579	527	267	134	86	73	490	807	1.632	953	886	954	872	1.161	769	91	109	67	202	284	455	973	823	646	498	495
3 February 2023	1.892	2.153	105	570	2.882	189	656	679	578	286	181	130	89	619	912	1.890	1.098	1.005	1.020	1.028	1.334	863	115	141	98	197	343	509	1.150	942	677	562	560
4 February 2023	1.907	2.080	104	560	2.910	178	592	690	543	216	150	112	162	566	912	2.062	1.010	1.104	995	945	1.553	869	81	116	57	168	348	534	1.115	1.125	712	587	555
5 February 2023	1.952	2.181	99	573	2.955	226	615	720	600	298	177	118	113	308	1.000	1.948	1.118	1.069	1.051	1.063	1.409	867	121	158	74	197	361	517	1.189	954	685	629	617
6 February 2023	1.821	2.072	88	541	2.847	197	660	674	562	291	152	109	80	550	907	1.788	1.043	928	977	948	1.198	759	93	164	76	200	333	453	1.037	882	582	552	551
7 February 2023	1.625	1.753	92	488	2.329	196	544	548	470	244	131	90	109	499	725	1.424	797	701	763	751	912	696	94	119	82	167	291	413	944	772	609	414	434
8 February 2023	1.561	1.857	114	490	2.339	106	569	544	503	238	161	70	117	479	762	1.481	842	847	852	788	1.070	687	79	124	154	300	402	929	835	552	374	427	
9 February 2023	1.690	1.944	81	447	2.657	212	636	623	565	300	143	86	145	480	775	1.674	1.031	920	942	880	1.301	789	123	143	274	418	973	860	614	537	521		
10 February 2023	2.022	2.286	98	585	3.049	227	704	709	604	308	160	120	148	597	978	1.941	1.177	1.158	1.091	1.031	1.557	904	109	168	78	188	343	528	1.190	1.037	644	611	620
11 February 2023	2.053	2.323	113	549	3.114	267	665	714	544	225	166	124	149	600	904	2.126	1.031	1.180	914	978	1.601	878	77	136	83	198	321	511	1.135	1.197	680	638	729
12 February 2023	2.004	2.379	104	612	3.257	240	696	776	604	317	162	124	142	603	1.021	2.065	1.256	1.237	1.091	1.100	1.596	877	106	157	207	337	514	1.122	1.054	701	681	705	
13 February 2023	1.941	2.183	515	3.042	214	685	717	592	291	153	118	124	552	996	1.933	1.054	1.056	818	153	166	88	219	299	476	1.068	953	640	606	597				
14 February 2023	1.605	1.799	495	2.603	177	600	588	498	224	146	112	116	465	823	1.745	965	870	937	903	1.250	752	116	134	76	150	245	406	936	912	601	503	529	
15 February 2023	1.651	1.935	518	2.588	150	616	598	536	292	140	84	150	480	867	1.672	979	942	926	851	1.235	786	117	109	63	189	255	450	988	827	646	455	464	
16 February 2023	1.963	2.137	561	2.858	276	667	626	568	301	143	107	136	500	893	1.740	1.018	792	827	827	1.114	826	127	164	115	161	279	450	1.088	893	680	558	604	
17 February 2023	1.652	1.978	537	2.964	206	598	680	509	278	158	110	135	528	1.003	1.992	1.200	1.103	1.105	1.057	1.532	823	192	223	146	287	249	457	1.009	1.010	624	603	532	
18 February 2023	2.166	2.300	696	3.199	175	725	719	597	242	177	118	177	622	1.042	2.274	1.196	1.240	1.134	1.170	1.736	925	116	200	142	244	347	563	1.168	1.256	750	748	750	
19 February 2023	2.076	2.440	588	3.236	225	731	719	589	328	169	127	182	616	1.101	2.155	1.353	1.240	1.170	1.199	1.683	893	148	188	133	244	359	565	1.211	1.127	704	772	721	
20 February 2023	1.982	2.271	567	3.047	225	721	669	575	284	149	108	122	554	958	1.994	1.192	1.129	1.080	1.065	1.527	832	143	188	135	175	281	498	1.123	998	636	636	604	
21 February 2023	1.657	1.901	511	2.716	205	632	553	488	223	136	100	133	469	855	1.822	1.039	934	981	907	1.301	800	109	161	224	260	402	1.031	914	667	539	523		
22 February 2023	1.703	2.040	488	2.660	181	647	548	558	291	139	85	92	463	869	1.756	1.083	942	973	933	1.305	800	100	130	91	220	248	453	975	879	607	561	538	
23 February 2023	1.851	2.113	586	2.839	238	696	638	593	317	80	86	145	487	897	1.832	1.132	994	1.031	969	1.389	850	73	188	174	233	255	419	1.109	1.022	688	658	635	
24 February 2023	2.164	2.329	612	3.109	213	714	733	630	363	96	100	132	638	1.024	2.062	1.255	1.136	1.138	1.139	1.558	997	127	185	169	274	312	545	1.269	1.049	738	727	714	
25 February 2023	2.090	2.266	575	3.062	263	710	786	645	301	78	114	177	587	1.000	2.218	1.182	1.265	1.129	1.106	1.696	944	176	136	251	328	535	1.187	1.243	755	722	739		
26 February 2023	2.156	2.433	568	3.199	261	714	745	645	319	93	127	132	644	1.062	2.173	1.286	1.239	1.121	1.165	1.642	986	165	199	135	237	337	555	1.246	1.135	752	716	748	
27 February 2023	1.925	2.188	502	3.119	252	724	682	605	301	69	102	100	600	971	1.946	1.229	1.054	1.087	1.075	1.477	869	128	175	249	333	480	1.164	967	630	654	641		
28 February 2023	1.690	1.952	448	2.718	626	552	522	276	67	97	117	493	838	1.807	1.040	948	978	950	1.300	779	166	81	228	281	402	1.070	957	635	576	564			

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