

Nov. 20, 2023

This report does not constitute a rating action

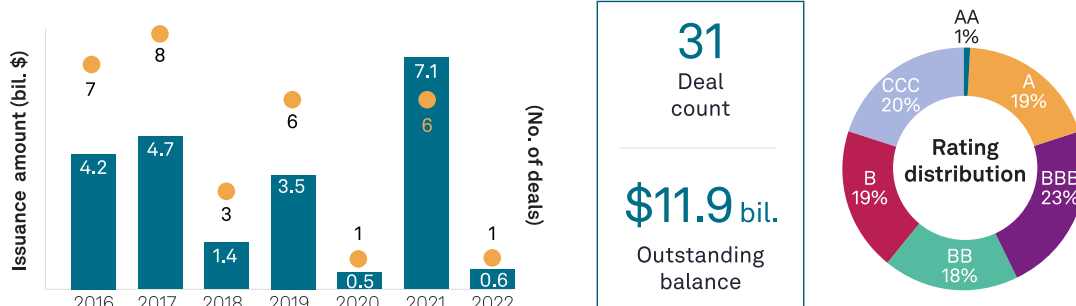
Key Takeaways

- We reviewed all 90 outstanding aircraft ABS ratings based on our updated March 2023 criteria, based on which we upgraded 38, downgraded 11, and affirmed 41 ratings.
- Global air traffic has almost reached 2019 levels on account of strong domestic and international travel demand in all regions. Consequently, both the base rent and utilization rent for the aircraft leasing asset-backed securities (ABS) transactions has been quite strong year-to-date (YTD) 2023, compared to the same period in 2022, despite the reduction in the number of aircraft in 2023 due to dispositions.
- YTD 2023, class B notes of the commercial aircraft lease ABS transactions have, in aggregate, received almost twice the amount repaid in 2022.
- AerCap, SMBC Aviation, CDB Aviation, and BOC Aviation have received insurance settlement payments under Aeroflot's insurance policies, the first payouts since the Russia/Ukraine conflict. However, there is no update on any insurance settlement proceeds for transactions with Russian exposure rated by S&P Global Ratings.

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New issuance



Rating activity in 2023

Rating category as of Jan 2023	Downgrades			Affirmations	Upgrades			Grand total
	Three and above	Two	One		One	Two	Three and above	
AA				1				1
A				5	7			12
BBB	2	1		7	7	4	1	22
BB	4		2	6	3	3	4	22
B	1	4	1	5	1	4	1	17
CCC			1	13		1	1	16
Grand total	7	5	4	37	18	12	7	90

Data as of August 2023 determination date. Source: S&P Global Ratings.

Aircraft ABS Overview

Aircraft and aircraft engine lease securitizations are typically backed by a diversified pool of assets generating lease rental payments and residual value at the end of their useful life. A typical portfolio consists of 10 or more aircraft or aircraft engines, which are leased to airlines globally.

This report covers 31 S&P Global Ratings-rated transactions, with 90 ratings outstanding as of Sept. 30, 2023; these include securitizations of aircraft loans and business jets (23 post-2008 aircraft lease ABS, three business jet ABS, three engine lease ABS, one aircraft loan ABS, and one pre-2008 aircraft lease ABS).

2023 YTD In Review

Despite the continuing strong recovery in the global aviation industry, the year began with negative sentiments--higher interest rates, inflationary pressure, and looming threat of a recession--carried forward from the end of 2022. These factors, as well as geo-political uncertainty, contributed partly to the absence of new aircraft lease ABS transactions rated by S&P Global Ratings so far in 2023.

Notable changes to our rated aircraft ABS portfolio:

- In March 2023, Castlake Aircraft Securitization Trust 2016-1 was redeemed in full and is therefore excluded from all statistics in this report.
- In August 2023, Castlake L.P. replaced Wings Capital Partners (LLC as well as Ireland Ltd.) as the servicer for two transactions: WAVE 2017-1 LLC and WAVE 2019-1 LLC. The change in and of itself did not have any impact on the outstanding ratings on these transactions.

Portfolio performance

The performance of aircraft ABS transactions rated by S&P Global Ratings has remained stable for the majority of the deals. Base rent collections so far in 2023 have been very strong at approximately 90% of the collections during the same period in 2022, despite a reduction in the number of aircraft owing to dispositions. Given the strong demand in air travel across all regions and the subsequent increase in air traffic, the utilization rent collections so far in 2023 for the transactions in our rated universe is approximately 20% higher than the same period in 2022. Table 1 provides a summary of base and utilization rent collections so far in 2023 and compares it with the 2022 collections. Total assets in the table include aircraft, airframes, and engines in the portfolio.

Table 1

Summary of rent collections

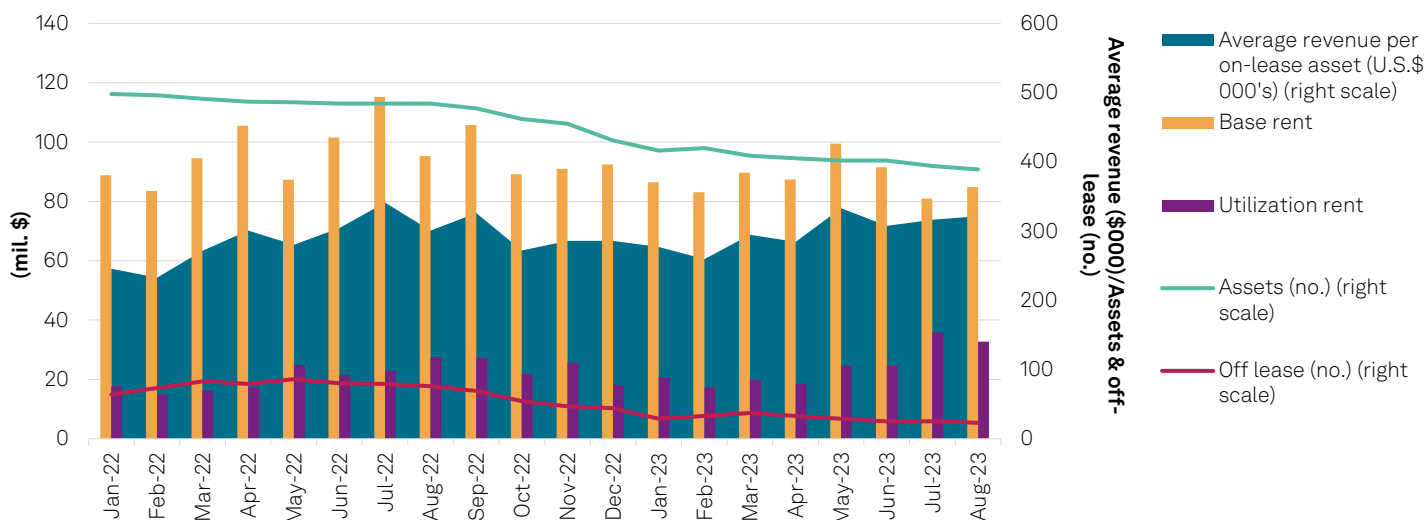
	Base rent (mil. \$)	Utilization rent (mil. \$)	Avg. on-lease assets (no.)
Jan - Aug 2023	703.34	194.20	375
Jan - Aug 2022	771.56	162.73	411
Jan - Dec 2022	1,149.85	255.57	408
YTD 2023 as a % of Jan-Aug 2022	91.16	119.34	91.28
YTD 2023 as a % of Jan-Dec 2022	61.17	75.99	91.91

Source: S&P Global Ratings.

Chart 1 shows the monthly trend in base and utilization rent collections since January 2022, along with total assets (aircraft, airframes, and engines) in the portfolio. There has been a significant decline in the number of off-lease aircraft. We observed that re-leasing as well as dispositions, especially of older aircraft, have contributed to this decline. The average revenue per on-lease asset has been generally on the rise since December 2022.

Chart 1

Monthly trends since January 2022



We also noticed some stability in half-life appraisal values through first-quarter 2023. Even though we did not observe any actual increase in valuations during this period, the pace of any value decline was relatively lower than valuation declines throughout 2022. We note that, more recently, half-life values have started to increase for most narrowbody aircraft types and some widebody aircraft types.

Rating actions

The strong revenue collections stated above resulted in some significant paydowns to the rated notes, especially the class A notes. Consequently, there were a number of upgrades across our rated transactions, the first since the pandemic.

In addition, in March 2023, we published our updated criteria for aircraft and aircraft engine ABS transactions, and then we subsequently placed all outstanding ratings under criteria observation

(UCO). In September 2023, we completed the review of all the transactions under the new framework.

The section below describes the rating changes from March to September 2023 (i.e., reflecting the impact on portfolio performance as well as the application of our updated criteria). Two deals, KDAC Aviation Finance (Cayman) Ltd. and Raptor Aircraft Finance I Ltd., were reviewed twice in 2023 and had different rating outcomes in each review. As a result, there will be some differences in numbers here compared to the rating action summary stated above (which compares rating actions from January to September 2023). Tables 2 and 3 provide an overview of the results of our UCO resolutions.

Table 2

Rating actions summary

	Sep-23	Mar-23
Ratings above original rating	24	0
Ratings at original rating	15	32
Ratings below original rating	51	58
Total	90	90

Source: S&P Global Ratings.

Table 3

Results of the UCO resolutions

Rating Action	No. of ratings	Avg notch changes	No. of ratings		
			One notch	Two notches	Three or more notches
Upgrades	38	1.8	18	13	7
Affirmations	41	-	-	-	-
Downgrades	11	-2.6	2	4	5

Source: S&P Global Ratings.

The upgrades primarily reflect a combination of strong recovery of the sector and rental collections, some recovery in aircraft appraisals, and improved credit enhancement/loan-to-value (LTV) ratio for the respective classes. Fourteen of these upgrades (including the ones above the original rating shown in table 2) relate to business jets and loan transactions, which were not as significantly impacted by pandemic and/or the Russia-Ukraine conflict as the aircraft and aircraft engine lease ABS deals. Seven of the remaining 10 upgrades above the original rating shown in table 2 relate to transactions issued in 2021, which had minimal impact from the pandemic and/or the Russia-Ukraine conflict and showed strong performance since closing.

The downgrades primarily reflect a combination of the deterioration in the relevant portfolios' performance, write-down of aircraft previously on lease to Russian airlines, and the relevant notes' insufficient credit enhancement at their previous rating levels.

Table 4 below provides a ratings transition matrix from March 2023, when we initially placed all the ratings on UCO, to September 2023.

Table 4

Ratings transition

Rating as of March 10, 2023	Rating as of Sep. 15, 2023															Total	
	AA	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC		CCC-
AA	1																1
A+																	
A		5	4														9
A-			2	1													3
BBB+			2	1	3		1			1							8
BBB		1		1	3	2			1								8
BBB-					1	3	2										6
BB+					2	1		3				1					7
BB					2		1	1	3	1		1	1				10
BB-								1	2								3
B+									2			2		1			5
B									1		1	2	1	2			7
B-											3		2				5
CCC+											1	1			8		10
CCC															7		7
CCC-																1	1
Total	1	6	8	3	11	6	4	5	9	2	7	5	5	10	7	1	90

Note: Green represents upgrades, grey represents affirmations, and red represents downgrades. Source: S&P Global Ratings.

Table 5 below shows the rating and note paydown trends observed so far in 2023. We observed that, YTD 2023, class B notes of the commercial aircraft lease ABS transactions have, in aggregate, received almost twice the amount repaid in 2022. The class C notes from all commercial aircraft lease ABS transactions, except one, continue to defer interest, which is capitalized to the outstanding note balance.

Market Insights: Aircraft Index Report

Table 5

Transaction Details

Deal name	Class	Balance as of		Amount paid		Ratings as of		Rating notch change
		Sept. 30, 2023 (mil. \$)	Jan. 1, 2023 (mil. \$)	YTD 2023 (mil. \$)	Full-year 2022 (mil. \$)	September 2023	January 2023	
AASET 2021-1 Trust	A	464.1	509.5	45.4	99.6	A+	A	▲
	B	102.9	116.5	13.6	5.4	BBB	BBB-	▲
	C	70.1	67.1	-3.0	3.8	B+	B	▲
Blackbird Capital Aircraft Lease Securitization Ltd. 2016-1	AA	30.4	48.0	17.5	29.1	AA	AA	↔
	A	339.6	347.1	7.5	27.3	A	A	↔
	B	41.6	41.6	0.0	1.2	BBB	BBB	↔
Blade Engine Securitization Ltd.	A-1	16.1	38.2	22.2	26.3	CCC	CCC	↔
	A-2	4.2	10.0	5.8	6.9	CCC	CCC	↔
BUSINESS JET SECURITIES 2020-1 LLC	A	99.0	182.3	83.4	113.7	A	A	↔
	B	20.9	31.1	10.1	15.4	A-	BBB	▲▲
	C	7.0	12.0	5.0	8.6	BBB+	BB	▲▲▲▲
BUSINESS JET SECURITIES 2021-1 LLC	A	272.9	377.9	105.0	75.8	A	A	↔
	B	45.3	58.2	12.9	9.4	BBB+	BBB	▲
	C	19.5	28.4	8.9	9.0	BBB-	BB	▲▲
BUSINESS JET SECURITIES 2022-1 LLC	A	411.4	468.9	57.5	43.9	A	A	↔
	B	48.4	55.2	6.8	5.2	BBB	BBB	↔
	C	24.8	30.6	5.8	5.2	BB	BB	↔
Castlelake Aircraft Structured Trust 2017-1R	A	125.0	190.0	65.0	61.6	BBB-	BBB-	↔
	B	52.6	53.7	1.0	6.3	B-	B+	▼▼
	C	42.4	40.4	-2.0	6.1	CCC+	CCC+	↔
DCAL Aviation Finance Ltd.	A-1	172.7	220.4	47.7	19.8	B-	B-	↔
	B-1	38.2	38.2	0.0	0.0	CCC+	CCC+	↔
	C-1	12.8	12.4	-0.4	-0.6	CCC	CCC	↔
ECAFI LTD.	A-1	51.2	54.7	3.4	6.5	CCC+	CCC+	↔
	A-2	384.1	409.7	25.7	38.0	CCC+	CCC+	↔
	B-1	80.2	80.2	0.0	5.0	CCC-	CCC-	↔
Falcon Aerospace Ltd.	A	45.2	80.7	35.5	11.7	A	A-	▲
	B	18.3	21.2	2.9	0.0	BBB	BBB-	▲
	C	10.3	9.8	-0.5	0.0	BB	BB	↔
Harbour Aircraft Investments Ltd.	A	151.8	172.0	20.2	50.1	BB	BB-	▲
	B	28.8	29.8	1.0	5.0	B	B	↔
	C	49.5	46.7	-2.9	-3.6	CCC	CCC	↔

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JOL Air 2019-1 Ltd.	A	308.0	338.8	30.8	38.9	A-	BBB+	▲
	B	64.2	66.9	2.7	0.0	BBB+	BB+	▲▲▲
KDAC Aviation Finance (Cayman) Ltd.	A	239.0	348.6	109.5	58.8	B+	BB-	▼
	B	73.9	73.9	0.0	0.0	CCC+	B	▼▼
	C	51.9	49.1	-2.8	-3.5	CCC	CCC+	▼
Labrador Aviation Finance Ltd.	A	354.9	390.2	35.3	33.7	BB+	BB+	↔
	B	81.8	81.8	0.0	0.0	B	B	↔
MAPS 2018-1 Ltd.	A	163.6	228.2	64.5	48.9	A	BBB+	▲▲
	B	29.3	34.8	5.5	2.1	BBB+	BB+	▲▲▲
	C	32.4	30.9	-1.5	-1.9	BB	B+	▲▲
MAPS 2019-1 Ltd.	A	120.4	173.0	52.6	72.5	BBB-	BBB+	▼▼
	B	64.4	64.4	0.0	1.1	B-	BB	▼▼▼▼
	C	31.6	29.9	-1.7	-2.1	CCC+	CCC+	↔
MAPS 2021-1 TRUST	A	228.1	327.8	99.7	73.8	A+	A	▲
	B	50.6	65.3	14.7	4.2	BBB+	BBB	▲
	C	42.5	41.3	-1.3	5.4	BB	BB	↔
Merlin Aviation Holdings DAC	A	52.6	72.7	20.1	29.9	BBB	BB+	▲▲
	B	7.7	10.0	2.2	-0.6	BB	B+	▲▲
	C	7.9	7.4	-0.5	-0.6	B	CCC+	▲▲
PK Air 1 LP	A-E	82.4	150.6	68.2	5.8	A+	A	▲
	A-F	962.2	1194.7	232.4	0.0	A+	A	▲
	A-R	805.4	848.1	42.7	-98.8	A+	A	▲
	B-E	22.0	22.0	0.0	0.0	BBB+	BB	▲▲▲▲
	B1-F	525.0	488.7	-36.3	-23.6	A	BBB+	▲▲
	B2-F	458.0	426.3	-31.7	-20.6	BBB+	BBB-	▲▲
	C-E	62.0	62.0	0.0	0.0	BB+	BB-	▲▲
	C-F	270.0	251.3	-18.7	-12.2	BB	BB-	▲
	D-E	84.5	84.5	0.0	0.0	B+	B-	▲▲
D1-F	46.0	42.8	-3.2	-2.1	B+	B-	▲▲	
Raptor Aircraft Finance I Ltd.	A	362.4	389.8	27.4	22.8	B+	BB+	▼▼▼
	B	90.6	90.6	0.0	0.0	CCC+	B+	▼▼▼
	C	54.6	51.9	-2.7	-3.4	CCC	CCC	↔
RASPRO Trust 2005	B	95.5	95.5	0.0	0.0	A-	A-	↔
Rotor Engines Securitization Ltd.	A	43.6	61.8	18.2	10.7	CCC+	CCC+	↔
	B	5.5	7.0	1.5	0.9	CCC	CCC	↔
	A	261.3	294.9	33.7	39.3	BBB+	BBB+	↔

Market Insights: Aircraft Index Report

Shenton Aircraft Investment I Ltd.	B	26.4	28.2	1.8	4.3	BB+	BB+	↔
	A	377.1	437.2	60.1	44.1	A	A-	▲
SPRITE 2021-1 LTD.	B	68.4	79.3	10.9	8.0	BBB	BBB-	▲
	C	46.3	50.7	4.4	8.6	B+	B+	↔
	A	202.2	230.9	28.8	47.4	BBB+	BBB+	↔
START Ltd.	B	67.0	87.9	20.8	0.0	BB-	BB	▼
	C	31.1	29.5	-1.6	-2.0	B-	B	▼
	A	274.4	297.5	23.2	31.3	BBB+	BBB	▲
Tailwind 2019-1 Ltd.	B	50.0	57.3	7.3	2.4	BB+	BB	▲
	C	42.4	40.2	-2.2	-2.7	B-	B-	↔
	A	96.3	127.1	30.9	19.1	A+	BBB	▲▲▲▲
Thunderbolt Aircraft Lease Ltd.	B	41.2	44.6	3.4	0.3	BB	B	▲▲▲
	C	12.0	11.7	-0.4	-0.5	B+	CCC+	▲▲▲
Turbine Engines Securitization Ltd.	2013-1A	114.0	120.4	6.3	10.7	BB-	BBB+	▼▼▼▼▼
	2013-1B	13.3	13.4	0.1	0.6	B	BB+	▼▼▼▼
	A	204.8	218.2	13.4	62.1	BB	BBB	▼▼▼
WAVE 2017-1 LLC	B	46.0	46.0	0.0	0.0	B	BB	▼▼▼
	C	23.6	22.4	-1.1	-1.4	CCC+	B	▼▼
	A	399.9	450.3	50.3	41.5	BBB+	BBB+	↔
WAVE 2019-1 LLC	B	78.3	78.3	0.0	0.0	BB+	BB+	↔
	C	47.9	45.7	-2.2	-2.8	CCC+	B	▼▼
Zephyrus Capital Aviation Partners 2018-1 Ltd	A	105.1	172.1	67.0	48.4	BBB-	BBB-	↔

Note: Negative amounts reflect the deferral of interest and capitalization into the principal balance of the notes. For PK Air 1 LP, it means additional drawings under the revolving loans. YTD--Year to date. Source: S&P Global Ratings.

Anticipated Repayment Dates (ARDs)

There is one transaction--Merlin Aviation Holdings DAC--with an ARD in December 2023. Castlake Aircraft Securitization Trust 2016-1 also was scheduled to reach its ARD in August 2023. The deal was paid off in full in March 2023 through disposition of aircraft needed to repay the outstanding amounts.

These seven deals have ARDs in 2024:

- Blackbird Capital Aircraft Lease Securitization Ltd. 2016-1;
- Falcon Aerospace Ltd.;
- Harbour Aircraft Investments Ltd.;
- KDAC Aviation Finance (Cayman) Ltd.;
- Labrador Aviation Finance Ltd.;
- Thunderbolt Aircraft Lease Ltd.; and

- WAVE 2017-1 LLC.

After the ARD, the classes may be repaid sequentially until they are fully paid off, and there will typically be a step-up in interest rate on the ABS notes that is paid at a subordinated step in the payment priority (non-payment of this step-up interest is not an event of default, and unpaid step-up interest typically accrues). In most transactions, the ARD-related turbo payment step in the payment priority is subordinated to scheduled principal payments. As transactions remain behind on their scheduled principal payments, there may be a lag before the classes benefit from the turbo payments. Our ratings on the notes address the timely payment of interest and ultimate payment of principal by their legal final maturity, and do not address payment of the step-up interest.

Portfolio Statistics

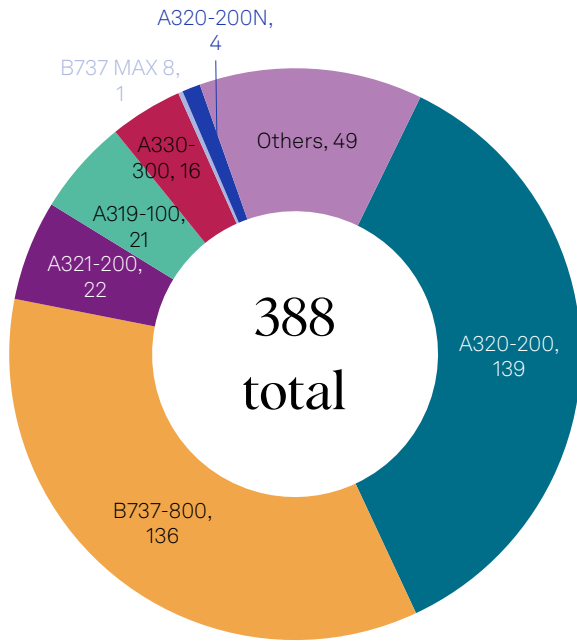
In the following section, we track some of the key portfolio metrics for the outstanding aircraft lease ABS transactions issued post-2008. The data is as of the September 2023 payment date report. It does not include any engines that remain in the portfolio after the associated airframe was sold. It does, however, include any airframe that remains in the portfolio after the engines were sold.

Aircraft types

Single-aisle aircraft, also referred to as narrowbody aircraft, represent the largest share of the global fleet. According to Boeing's Commercial Market Outlook 2023-2042, single-aisle aircraft will represent 70% of the fleet in 2042, up from 66% currently. The report also states that single-aisle aircraft is expected to account for 76% of new deliveries between now and 2042. These aircraft are generally easier to re-lease given the lower transition costs and large number of airline operators in comparison to twin-aisle widebody aircraft. Approximately 90% (by count) of aircraft in the outstanding transactions are narrowbody, and of those, approximately 71% (by count) are either A320-200s (36%) or B737-800s (35%).

Chart 2

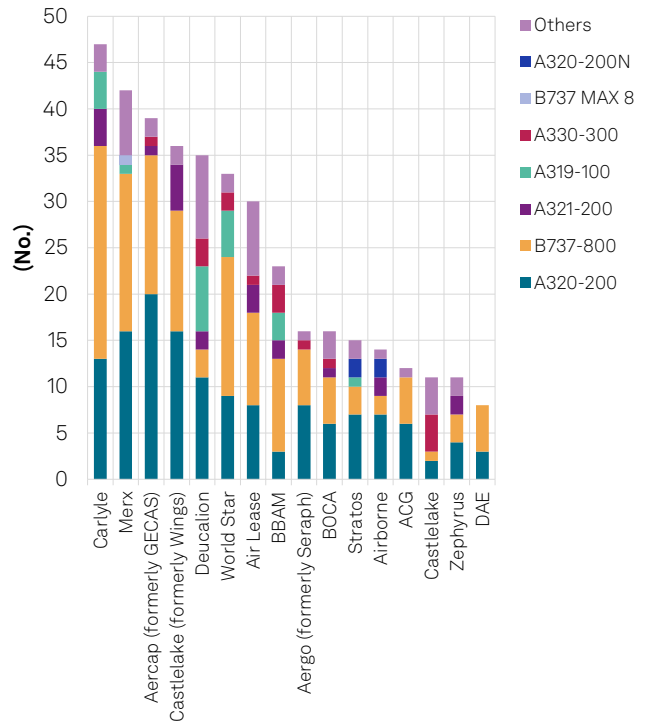
Major aircraft types (no.)



Source: S&P Global Ratings.

Chart 3

Distribution of aircraft types across servicers



DAE--Dubai Aerospace Enterprise. GECAS--GE Capital Aviation Services Ltd. Source: S&P Global Ratings.

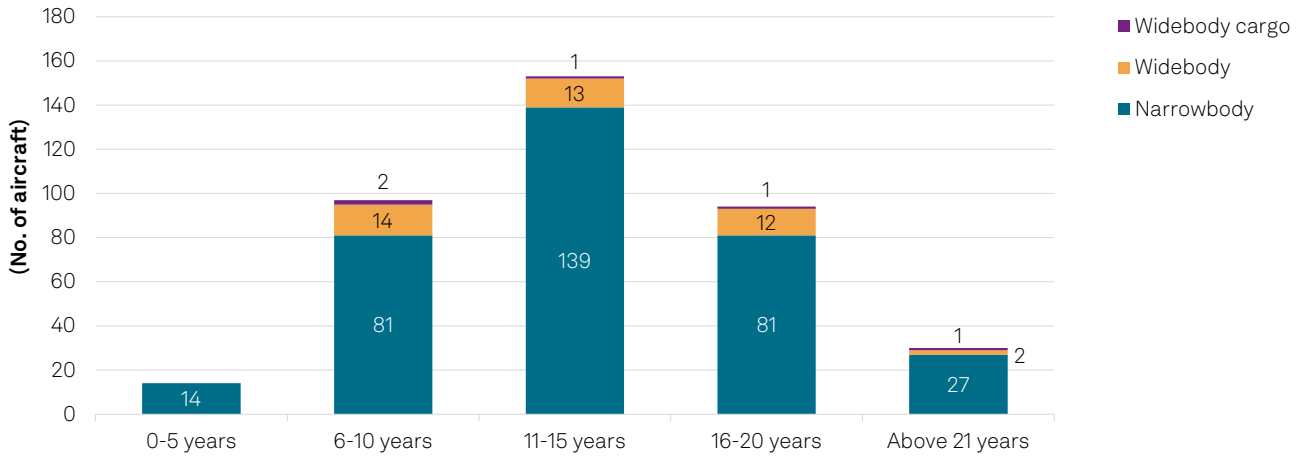
Aircraft age

The average aircraft age in the transactions currently outstanding is approximately 13 years and ranges between eight and 21 years, as of Sept. 30, 2023.

Prior to the COVID-19 pandemic, transactions rated by S&P Global Ratings were typically backed by pools of mid-life to end-of-life aircraft. More recent transactions, specifically those issued in 2021, generally consisted of younger aircraft on lease to airlines with a stronger credit profile. Typically, airlines that lease aging aircraft or aircraft engines historically tend to be of lower credit quality and located in lower-rated jurisdictions.

Chart 4

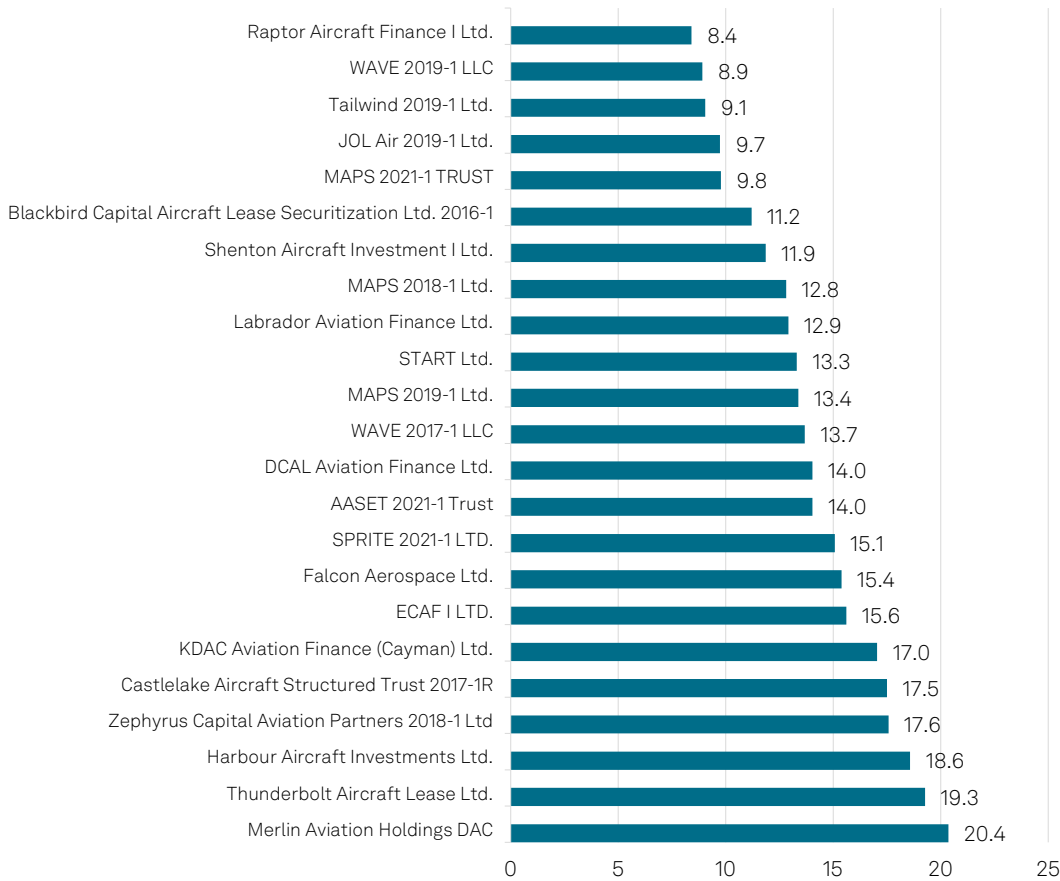
Age of portfolio by airframe type



Age calculated as of Sep. 30, 2023. Source: S&P Global Ratings.

Chart 5

Average portfolio age by issuer (%)



Age calculated as of Sep. 30, 2023, as a simple average age of all the aircraft (excluding any component engines but including airframe) in a portfolio. Source: S&P Global Ratings.

Lease Expiry

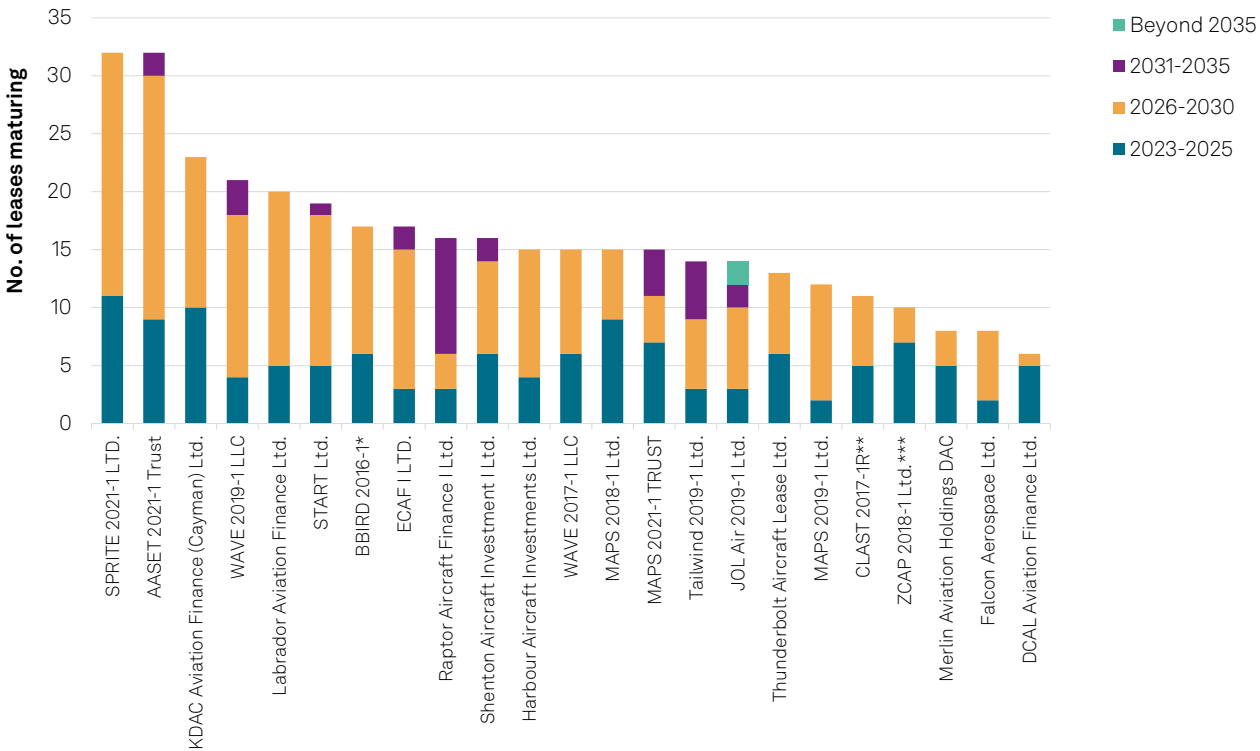
A concentration of lease maturities in a short time frame may expose a transaction to potential re-leasing and remarketing risk. For example, transaction cash flows may be significantly reduced if the re-leasing event occurs during an industry downturn when lessors typically have less bargaining power. Most servicers of S&P Global Ratings-rated transactions have indicated that they typically begin planning for re-leasing events 12-24 months in advance of the lease maturity.

In the current market, which is dominated by a shortage of narrowbody aircraft in particular and, increasingly, widebody aircraft as well, many lessees decide to extend existing leases, often at a higher rent as they want to hold on to their capacity. Additionally, various engine-related issues in the industry have also significantly increased the number of aircraft that are temporarily grounded as their engines are serviced.

Chart 6 below shows lease expirations in our outstanding rated transactions.

Chart 6

Distribution of lease expiry by issuer

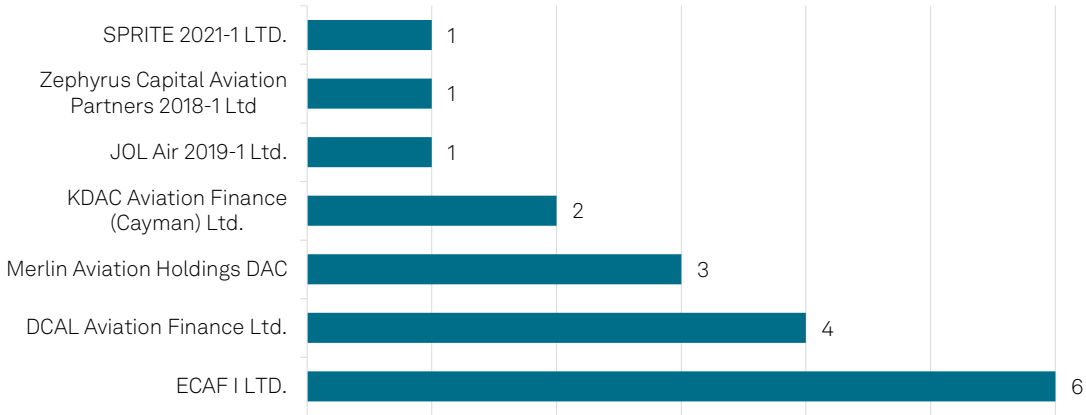


*Blackbird Capital Aircraft Lease Securitization Ltd. 2016-1. **Castlake Aircraft Structured Trust 2017-1R. ***Zephyrus Capital Aviation Partners 2018-1 Ltd. Source: S&P Global Ratings.

Chart 7 lists the number of off-lease aircraft for relevant transactions. The data does not include off-lease engines, if any, after the associated airframe was sold. It does include any off-lease airframe.

Chart 7

Distribution of off-lease aircraft across issuers



Source: S&P Global Ratings.

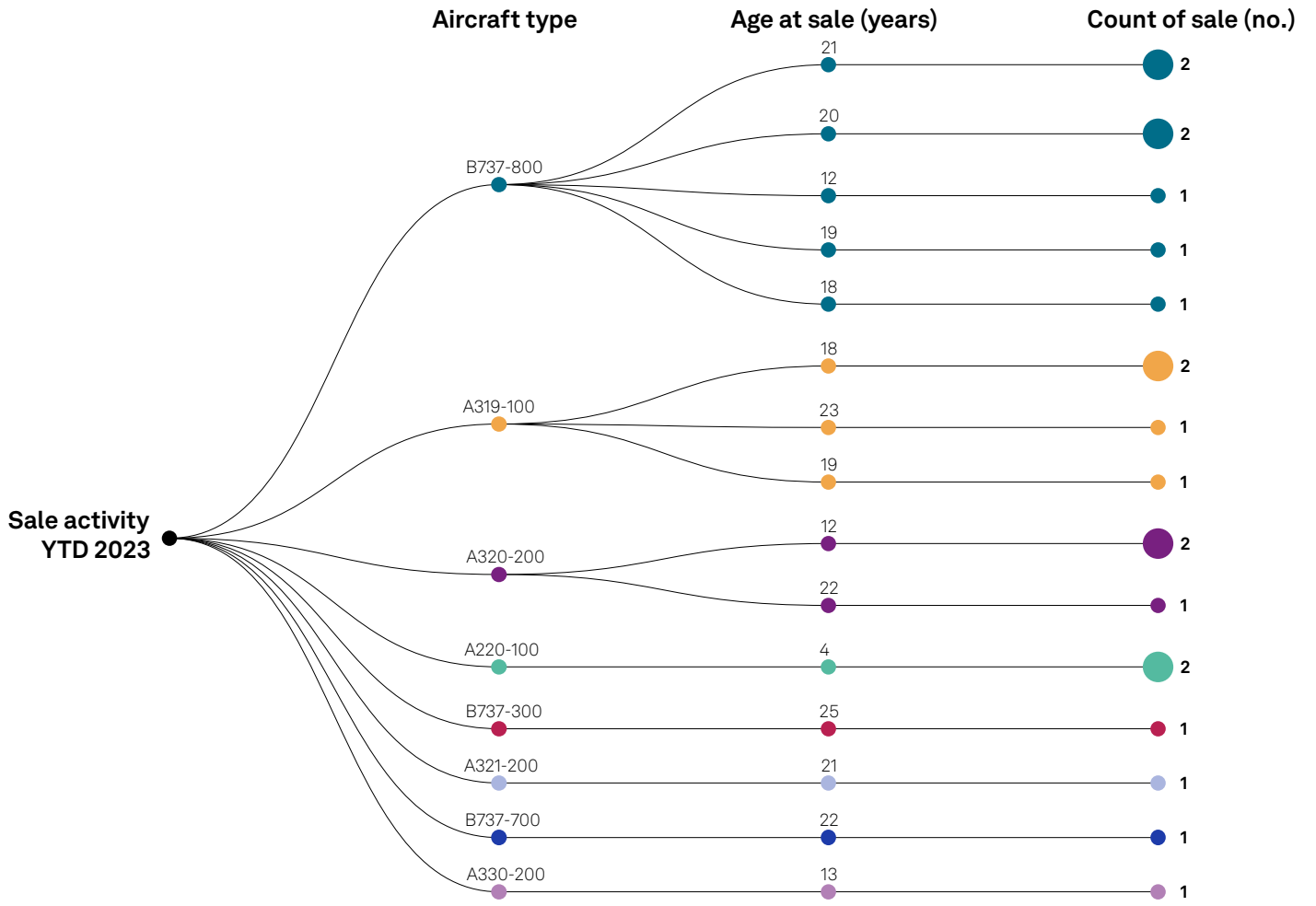
Sale Activity YTD 2023

Most aircraft in the ABS pools are generally sold towards the end of their useful life. In the current market, where there is a general shortage of engines, the airframe is often sold, and the engine is re-leased. This generally occurs when there is sufficient green time left in the engines. Older B737-800 aircraft are frequently purchased as part of a freighter conversion strategy by the new owner. Lessors may also consider selling an aircraft at the end of a lease to avoid making investments to upgrade the cabin and inflight entertainment required for a new lessee, or to avoid a major and expensive maintenance event. Recently, we also see more opportunistic sales of newer aircraft with a long-term lease attached that are driven by an attractive sale price compared to book value.

Chart 8 provides details on all aircraft disposition activities observed so far in 2023 by aircraft type and age at the time of disposition. The age is determined based on the month in which the aircraft was sold.

Chart 8

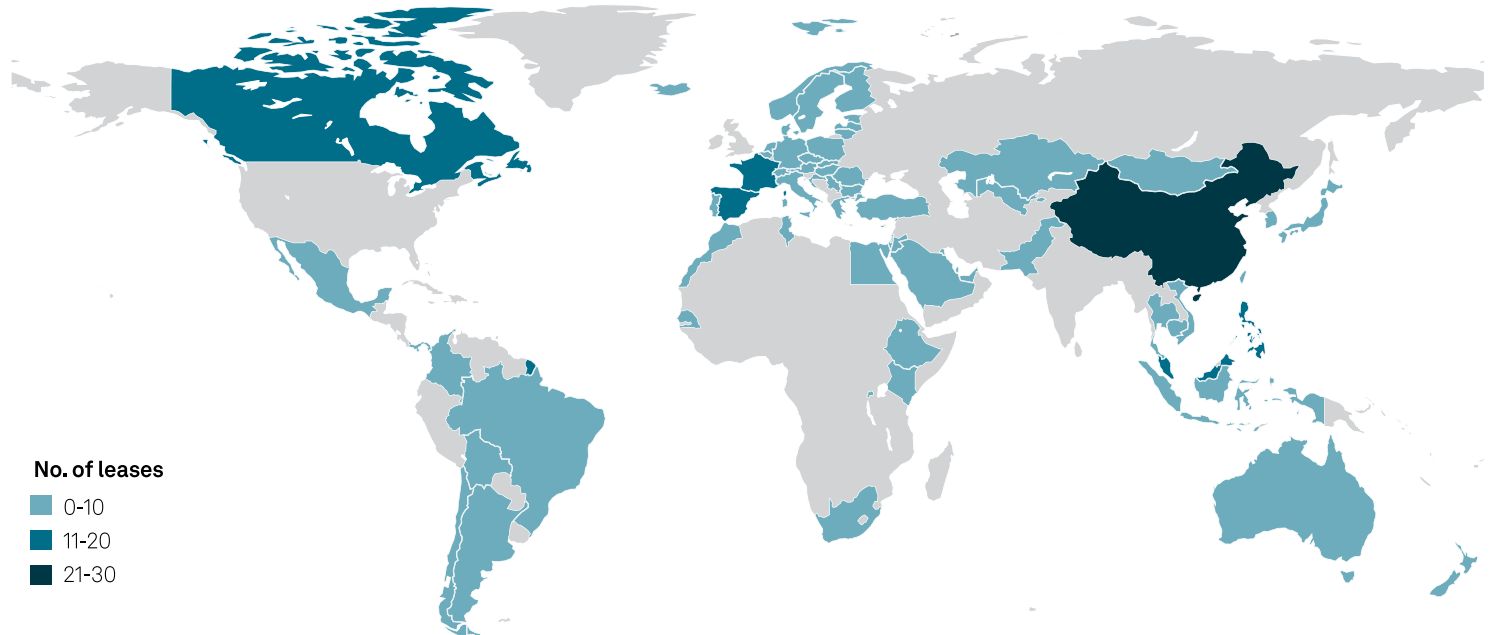
Aircraft sales by age (no. of sales)



Source: S&P Global Ratings.

Chart 9

Count of lease by country



Source: S&P Global Ratings.

Related Research

Date	Title
Sep-06-2023	Various Rating Actions Taken On 38 Classes From 14 Aircraft ABS Transactions
July-18-2023	Various Rating Actions Taken On 29 Classes From Eight Aircraft ABS Transactions
May-16-2023	Various Rating Actions Taken On 23 Classes From Nine Aircraft ABS Transactions; 20 Classes Off CreditWatch
March-10-2023	Ratings On 92 Classes From 32 Aircraft And Aircraft Engine ABS Transactions Placed Under Criteria Observation
March-10-2023	Global Aircraft ABS: Methodology And Assumptions
Feb-24-2023	Aircraft Index Report

Meet The North America SF Non-Traditional Team

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