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Air Transport Traffic, Fleet & MRO Update

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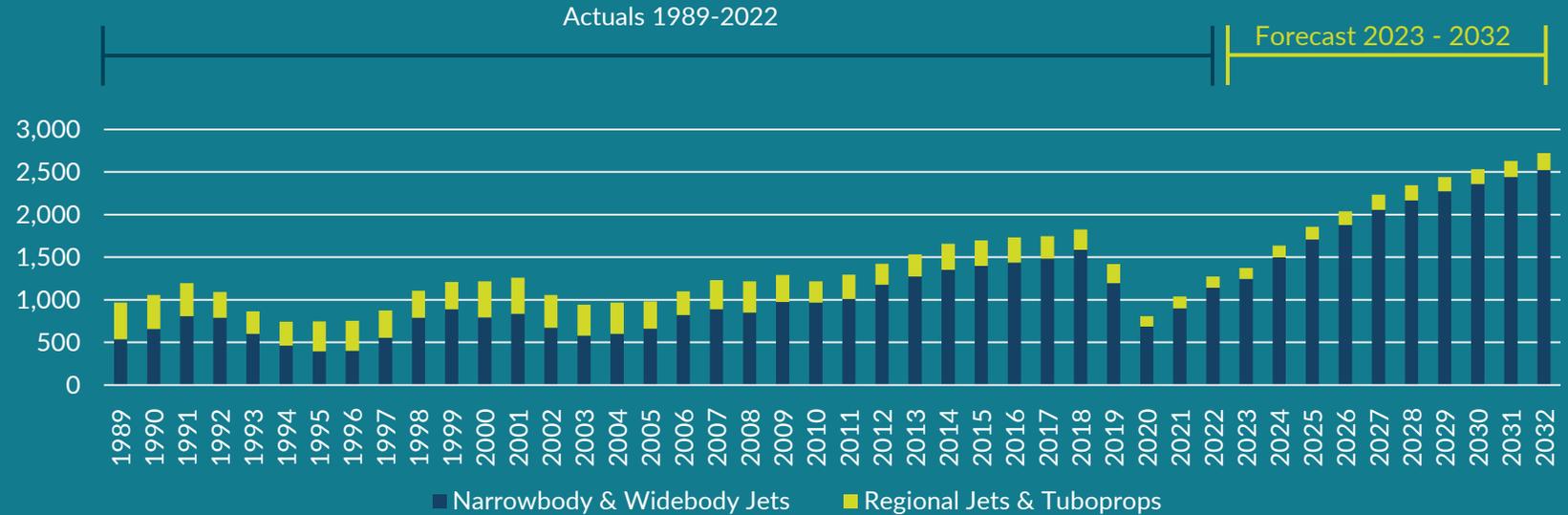
Air Transport Aircraft Production Delivery Forecast

Air Transport Aircraft Production Delivery Forecast

It will likely take until 2025 for air transport aircraft deliveries to exceed 2018 levels

- ▲ Between 2023-2032, there are ~21,810 forecasted new air transport deliveries valued at ~\$1,581B
- ▲ These are made up of ~20,146 narrowbody and widebody aircraft and 1,664 regional aircraft (jets and turboprops)
- ▲ Deliveries will take until 2025 to exceed 2018 levels (the previous peak). 2019 deliveries were lower due to the 737 MAX grounding
- ▲ Supply chain issues continue to impact production ramp-ups

Air Transport Annual Deliveries - History & Forecast (Qty of Aircraft)



Air Transport Deliveries - History & Forecast Value (2023 \$B)



Air Transport Capacity & Fleet Utilization



Naveo forecasts a strong recovery in air traffic capacity in the coming years

- ▲ Aviation capacity is likely to exceed the previous high water mark for the industry, recorded in 2019 before the outbreak of the pandemic
- ▲ The spread between the optimistic and pessimistic scenarios reflects the extent of structural changes to the aviation industry caused by the pandemic
- ▲ There is also significant geopolitical risk due to the Ukraine conflict and escalating tensions between the US and China
- ▲ High oil, energy prices, and inflation are also impacting household budgets
- ▲ In 2023 travel capacity will exceed 2019 levels, it will not regain the 'lost' travel that didn't occur due to COVID-19 restrictions in 2020-2022

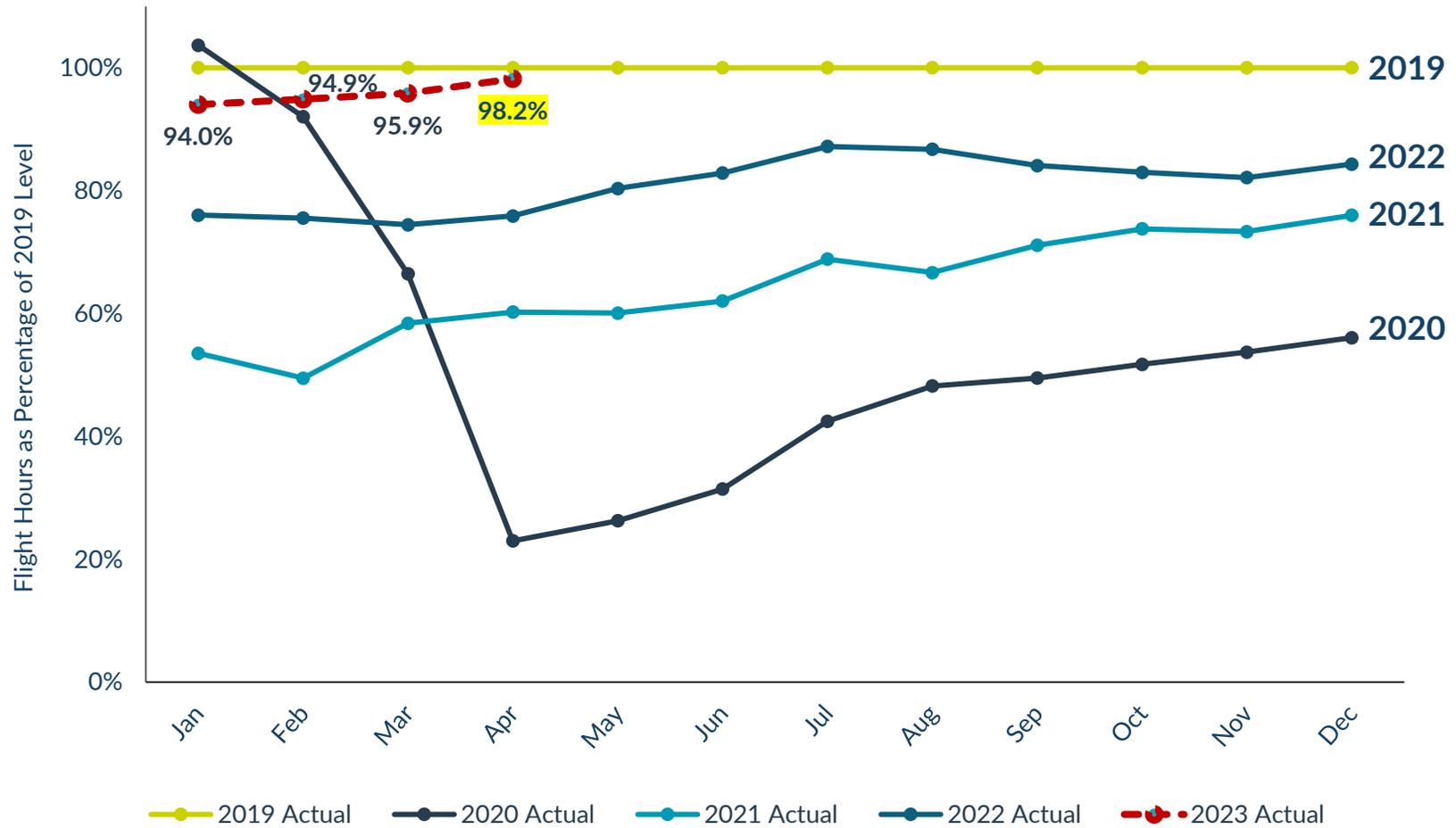
Global Aviation ASK Capacity Forecast, 2015-2025



The recovery has continued, with global air transport aircraft utilization in April reaching 98% of its 2019 level

- ▲ April 2023 aircraft utilization reached 98% of 2019 levels, representing an incremental continuation of capacity recovery following the lifting of travel restrictions
- ▲ Business travel and VFR markets appear much slower to recover, with business travel significantly lagging pre-pandemic levels
- ▲ A strong summer peak will likely emerge due to a busy holiday season in North America and Europe

Global Aircraft Utilisation Overview, 2019-April 2023
Indexed to 2019

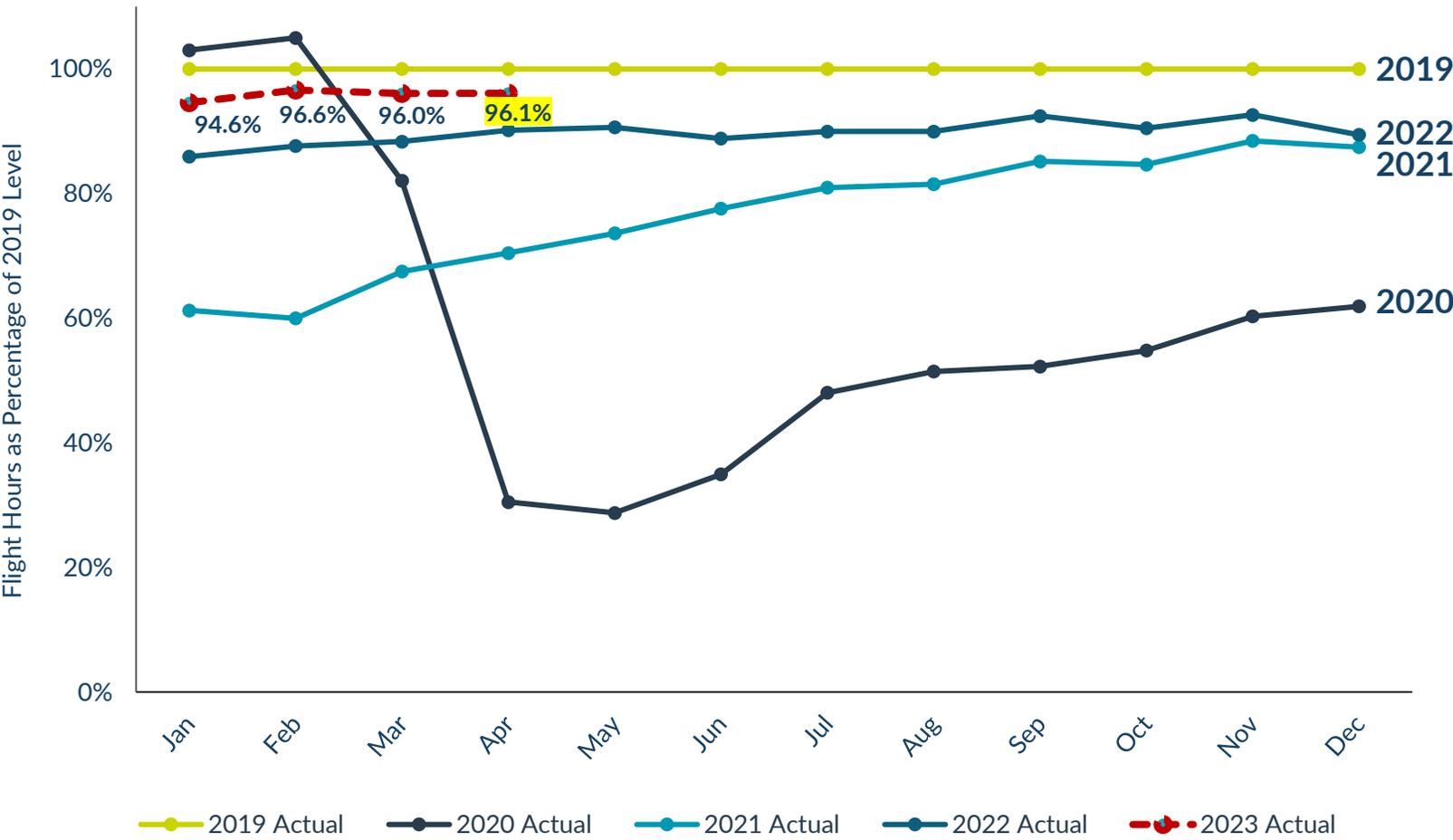


Source: Aviation Week, Naveo analysis
Note: Percentages indicate proportion of 2019 capacity

North American aircraft utilization has been steady at ~96% of 2019 levels since February

- ▲ April 2023 aviation capacity in North America remained flat at 96%
- ▲ US economic growth and labor markets remain robust, supporting growing travel demand
- ▲ US corporate travel remains subdued by ~25% compared to 2019 levels, highlighting the permanent impact of the pandemic on consumer behavior
- ▲ Leisure and VFR travel is currently driving the recovery and, in some ways compensating for the slow return of business travelers

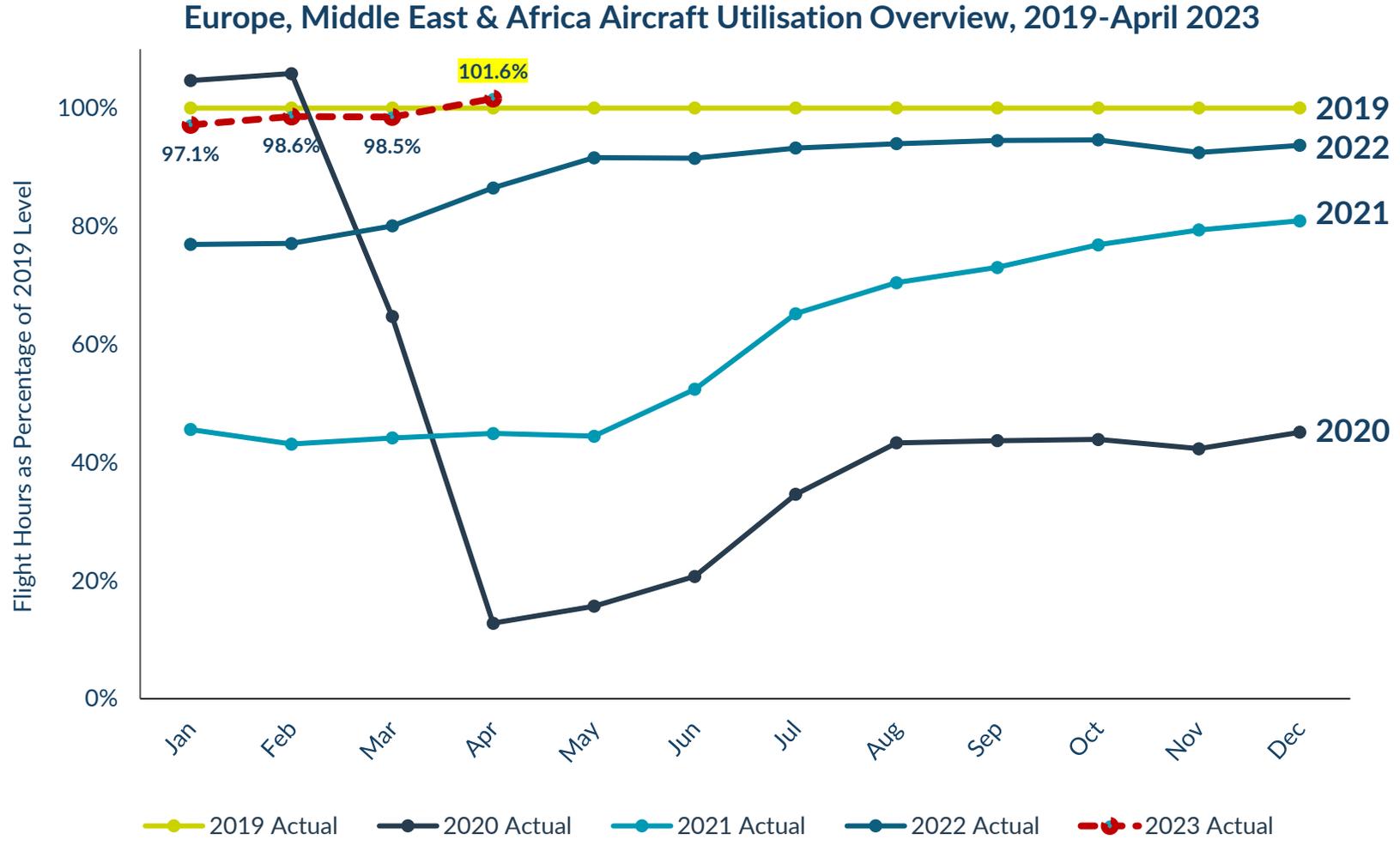
North America Aircraft Utilisation Overview, 2019-April 2023



Source: Aviation Week, Naveo analysis
 Note: Percentages indicate proportion of 2019 capacity

Growth in the EMEA region increases slightly, driven primarily by continued strong growth in the Middle East

- ▲ Europe, Middle East, and Africa utilization was 101.6% of 2019 levels in April 2023
- ▲ Middle Eastern carriers continue to benefit significantly from the closure of Russian airspace, with travel times via the Gulf competitive with direct routings
- ▲ As with the North American market, the delta to 2019 levels of travel will be explained by structural realignment of the market and consumer preferences rather than due to pandemic-related restrictions
- ▲ A strong summer peak in traffic is expected, with European airlines reporting strong forward bookings for the summer season

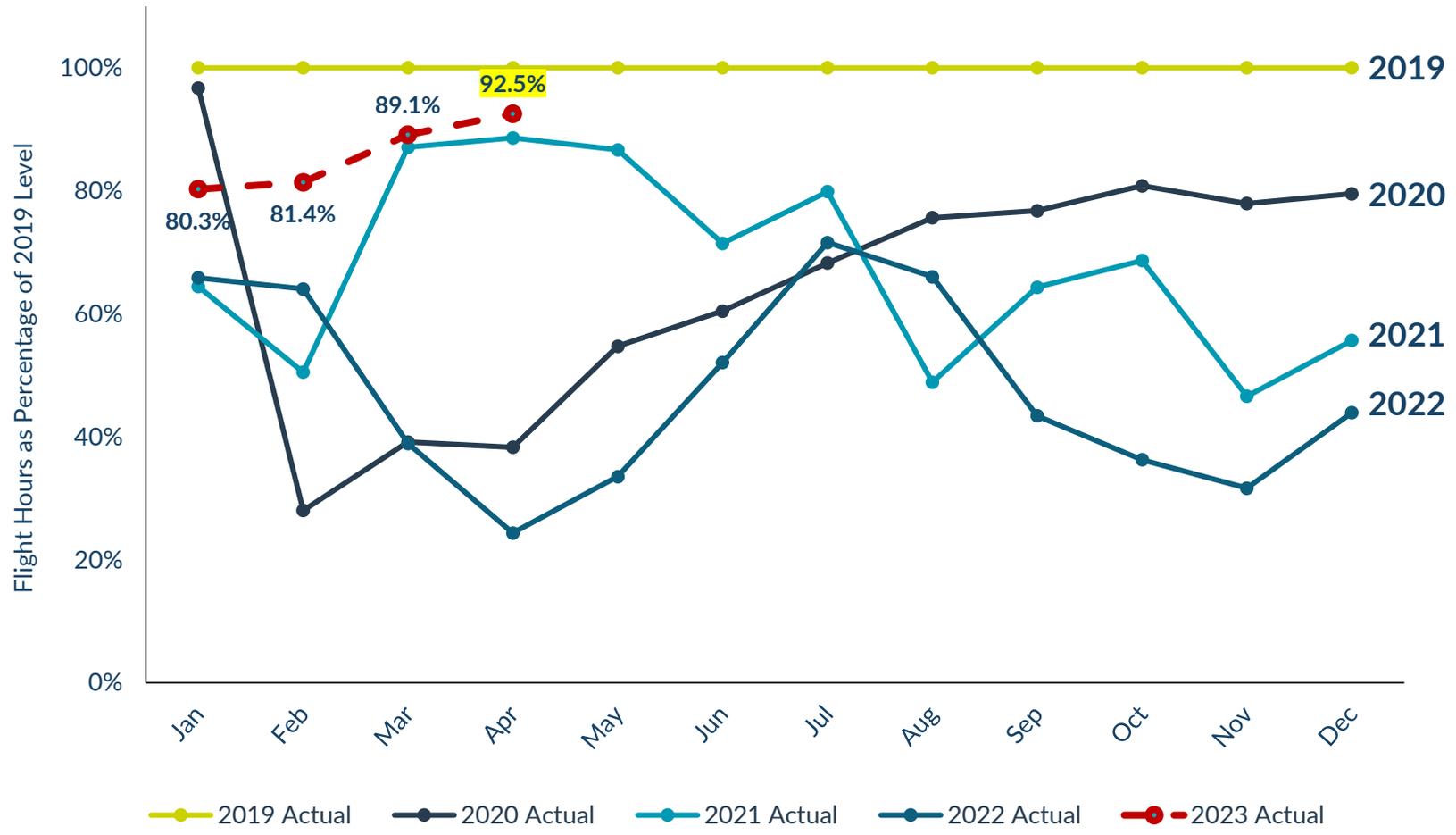


Source: Aviation Week, Naveo analysis
 Note: Percentages indicate proportion of 2019 capacity

Chinese aircraft utilization reaches a post-pandemic peak of 93% of equivalent 2019 traffic as economic growth remains steady

- Chinese aircraft utilization rebounded to 93% of 2019 levels in the month of April
- This represents the highest monthly level of capacity recorded since the outbreak of the pandemic in early 2020
- Economic recovery in China continues to exceed expectations, providing optimism that poor consumer confidence caused by woes in the housing market will recede
- China's big three carriers are, however, warning that international travel is slow to recover and still lags considerably behind the recovery in domestic traffic

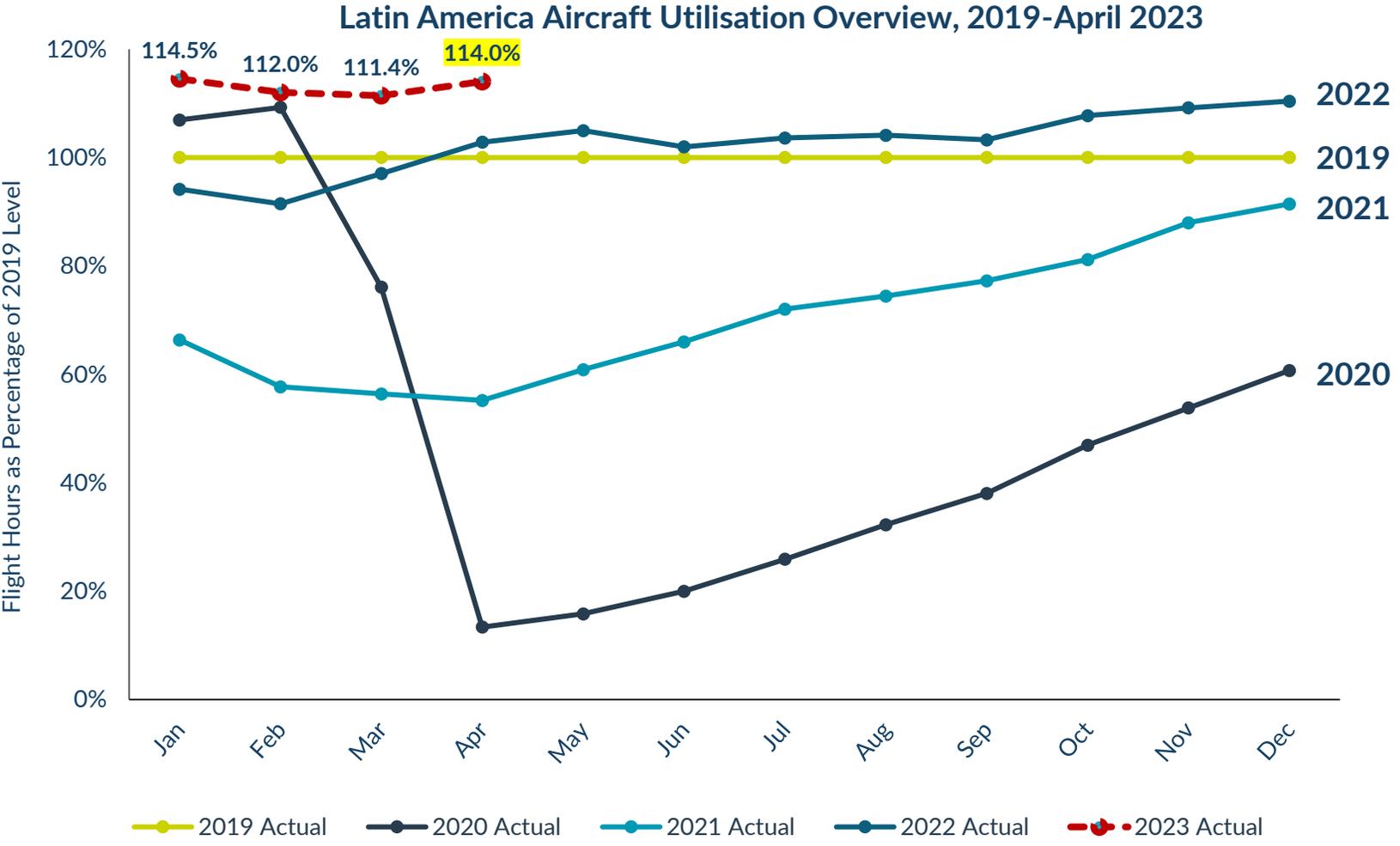
China Aircraft Utilisation Overview, 2019-April 2023



Source: Aviation Week, Naveo analysis
 Note: Percentages indicate proportion of 2019 capacity

Latin America continues to lead the global aviation recovery, with further growth in capacity seen in April

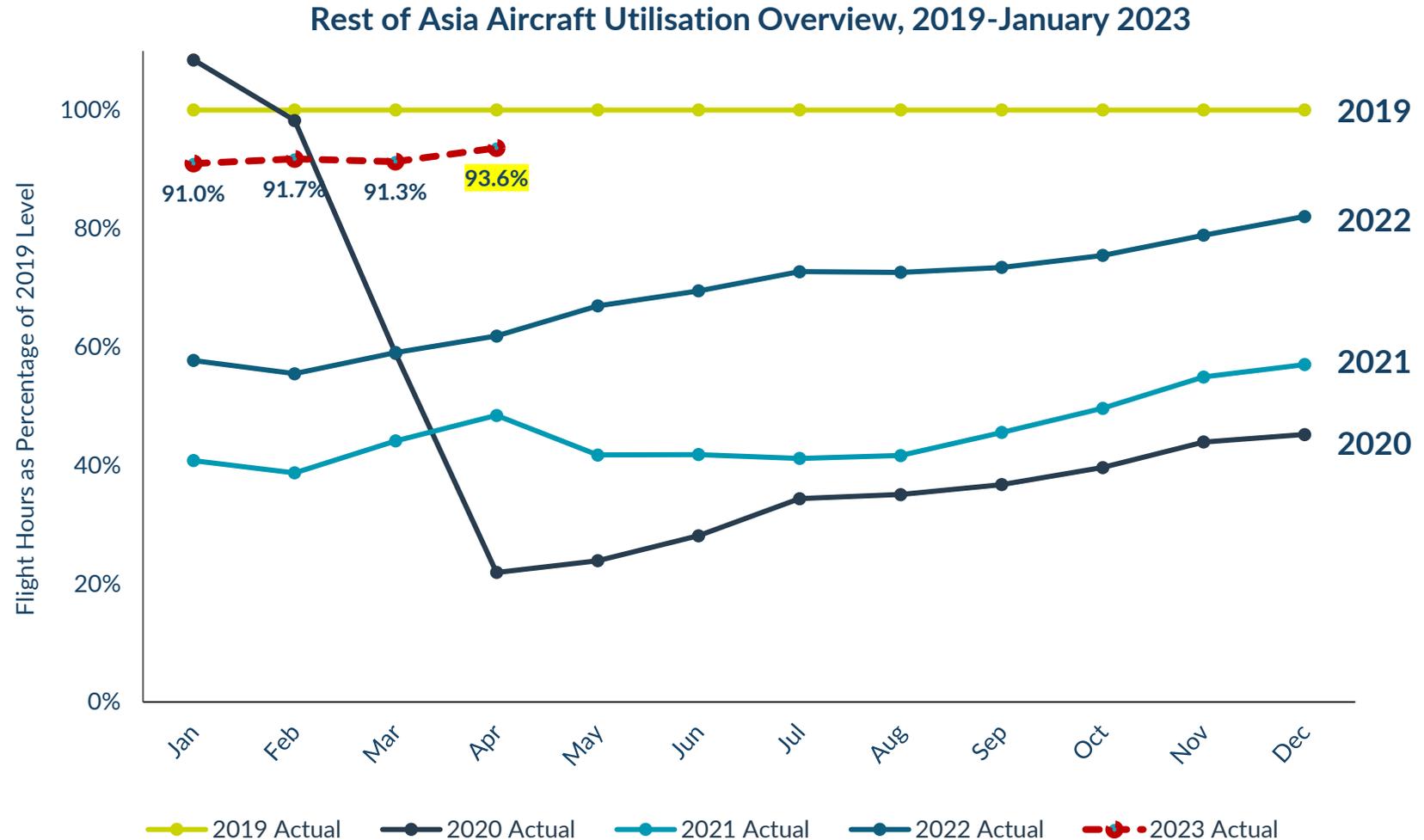
- ▲ The South American market continues to exceed its pre-pandemic level, with flight hours in April remaining over 114% of their equivalent level in 2019
- ▲ Domestic markets in Latin America have exceeded pre-pandemic levels since March, with the slow recovery in international travel preventing more enthusiastic growth
- ▲ A commodity price boom is generally good for all major South American markets and is strengthening domestic aviation demand
- ▲ The strong dollar is also boosting international travel to South America despite rising fuel prices in the region



Source: Aviation Week, Naveo analysis
 Note: Percentages indicate proportion of 2019 capacity

Aviation capacity jumped to 94% in April as intra-regional tourism returned to key tourism markets in APAC

- ▲ The Asia Pacific region (excluding China) saw aircraft utilization rise slightly to ~94% of 2019 levels in April 2023
- ▲ Domestic traffic continues to see strong growth across the region, although international traffic remains slow to return
- ▲ The removal of Chinese travel restrictions was a considerable boost to the fortunes of the aviation industry in the region
- ▲ The return of inbound tourists to China from mid-March should lead to a further boost in the region's aviation demand

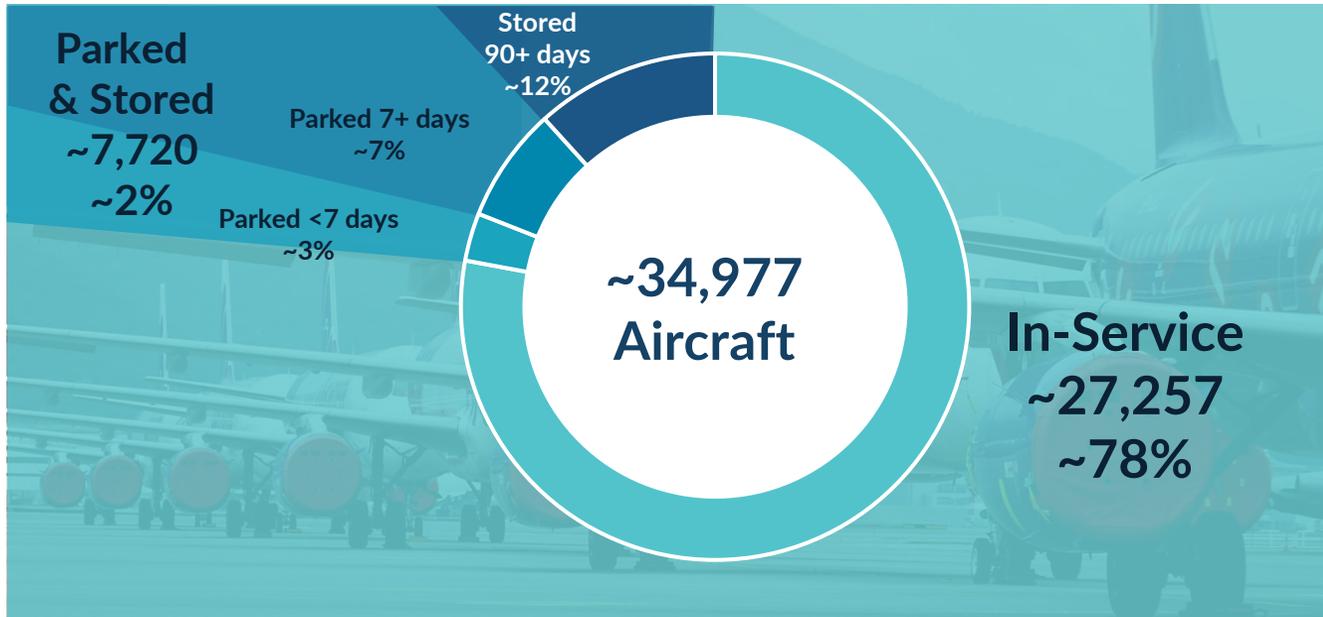


Source: Aviation Week, Naveo analysis
 Note: Percentages indicate proportion of 2019 capacity

Fleet Status Late May 2023

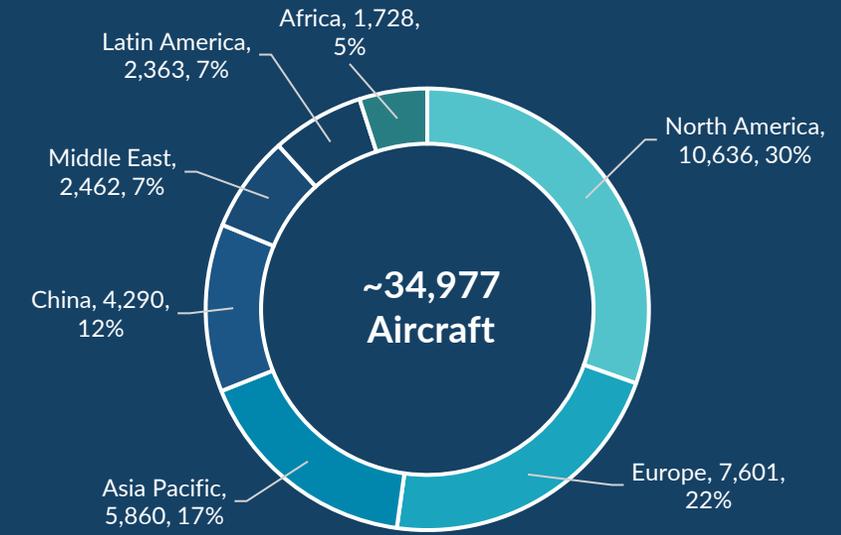
In late-May, ~78% of the global air transport fleet was in active service, and ~22% parked/stored

Air Transport Fleet Status Late May 2023
(Qty of Aircraft In-Service and Parked/Stored)

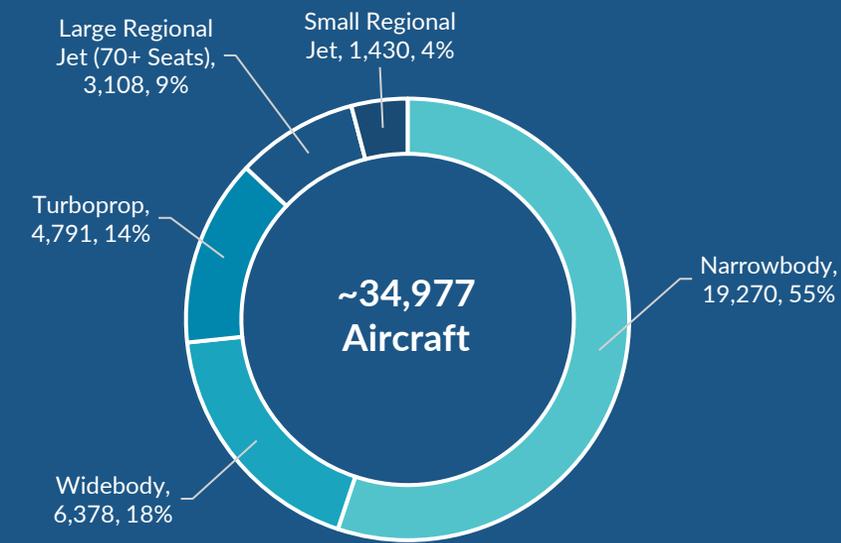


- ▲ ~78% of the air transport fleet is in active service (~27,257), and ~22% (7,720) are parked or stored
- ▲ This is an improvement on February 2023 when ~77% of the fleet was in active service, so the improvement continues
- ▲ However, as we've seen, the fleet situation continues to be fluid. Many short-term aircraft parked for less than seven days (~1,067), and a further ~2,561 parked for more than seven days and less than 90 days.
- ▲ There are ~4,092 aircraft that have been stored for longer than 90 days. That's down from ~4,422 seen in February

Air Transport Fleet By Region
(Qty of Aircraft In-Service, Parked & Stored)

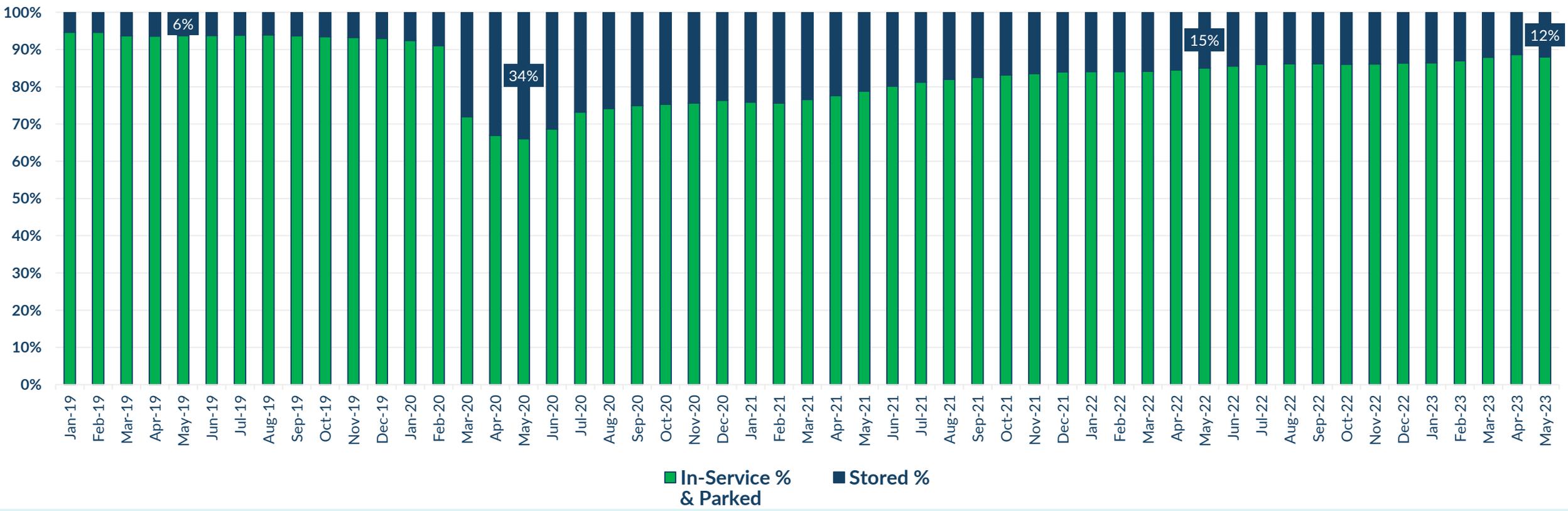


Air Transport Fleet By Size
(Qty of Aircraft In-Service, Parked & Stored)



The percentage of the air transport fleet stored 90+ days has slowly been reducing since April 2020. It's currently at 12%, still above the 2019 levels of 5% to 6%

Stored Fleet as % of In-Service/Parked 2019 Late May 2023



- ▲ In May 2019, ~6% of the air transport fleet was stored. That means inactive for 90 days or more. It's currently double that rate at 12%
- ▲ The stored fleet peak was in April and May 2020, when 33/34% were inactive
- ▲ May 2022 saw 15% of the fleet stored, so a year later, in May 2023, the situation has improved to 12%

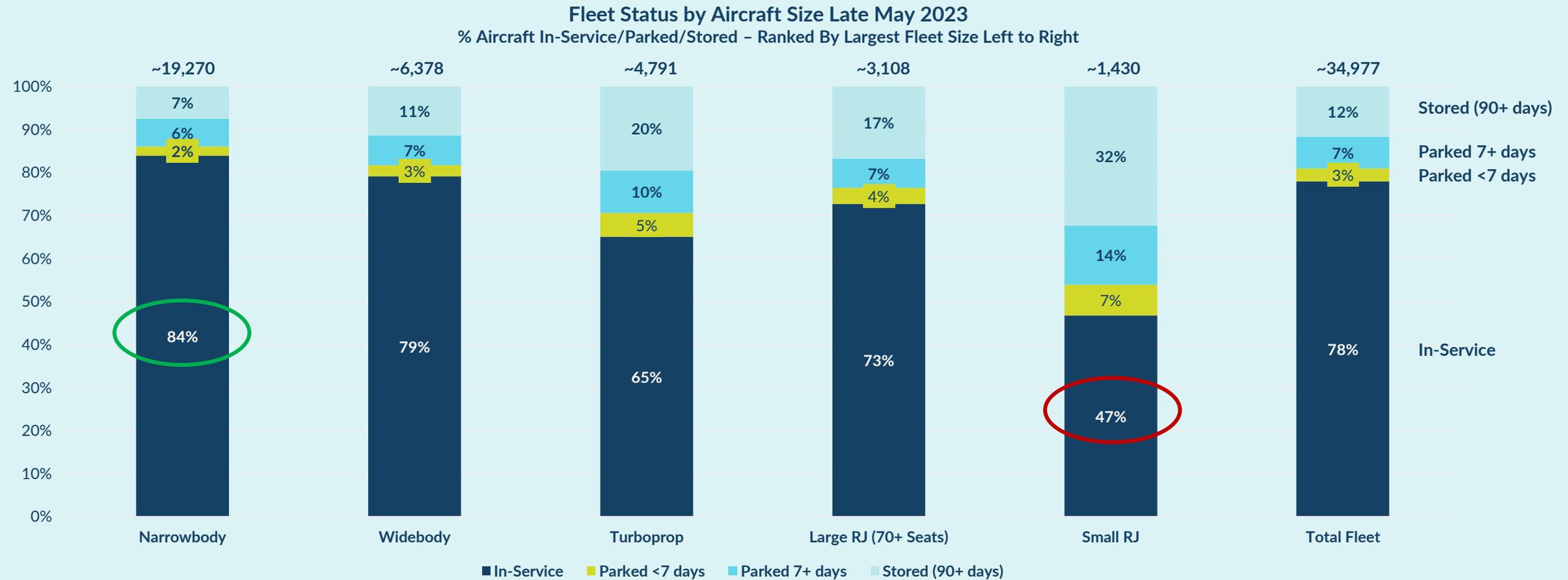
Most regions continue to see a higher proportion of their fleet in active service in May

Air Transport Fleet Status by Operator Region Late May 2023
 % Aircraft In-Service/Parked/Stored - Ranked By Largest Fleet Size Left to Right



- Overall, ~78% of the global fleet was in active service in late May 2023, yet there are some regional differences
- Europe has ~74% of its fleet active (up from 69% in February), so the recovery is good to see
- China (90%), Asia Pacific (79%), and the Middle East (80%) saw improvements compared to February. North America, at 77%, is at the same level seen in February
- Latin America and Africa saw dips in their % fleet in service, with Latin America down 2% since February and Africa down 1%

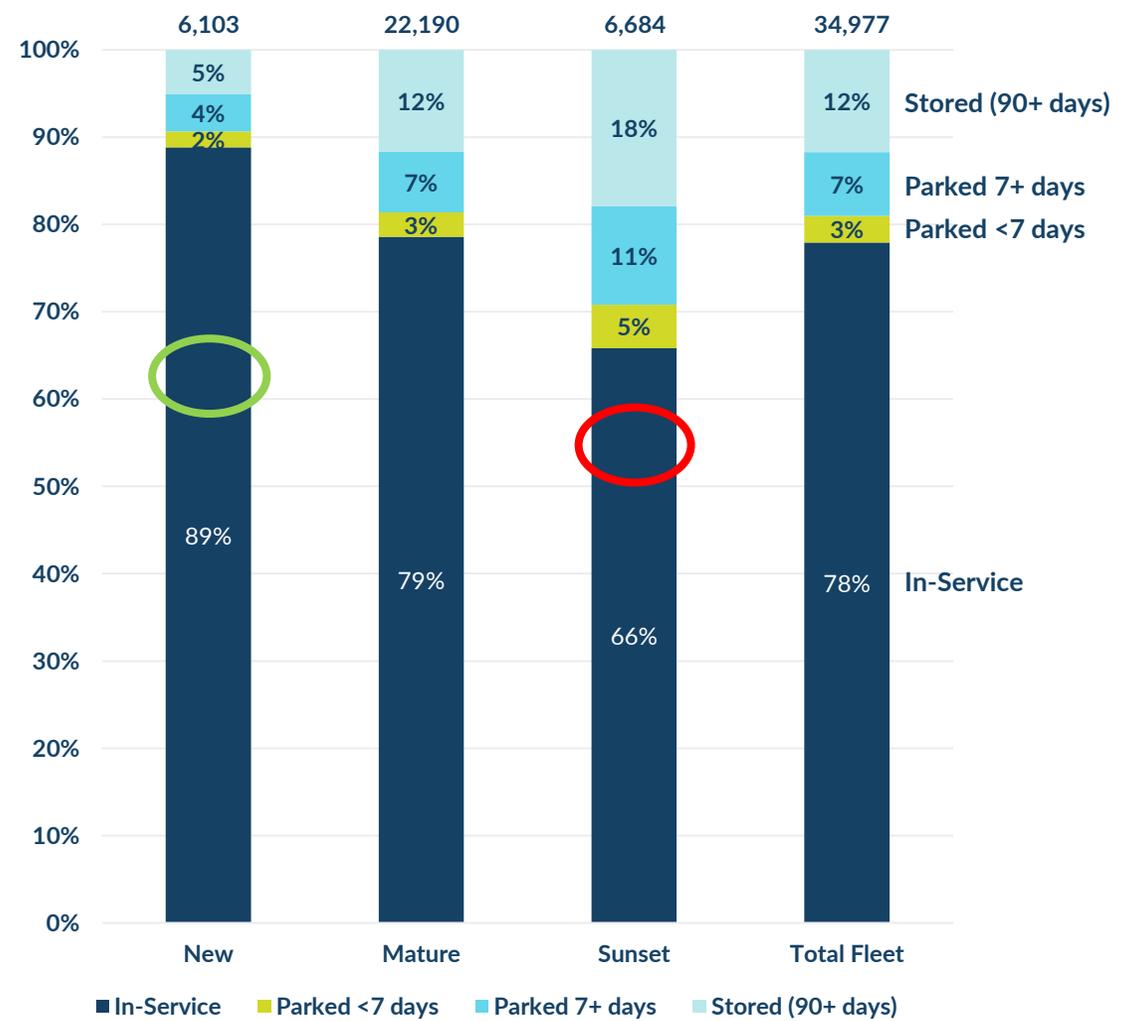
Narrowbody aircraft continue to lead the traffic recovery, with ~84% actively flying



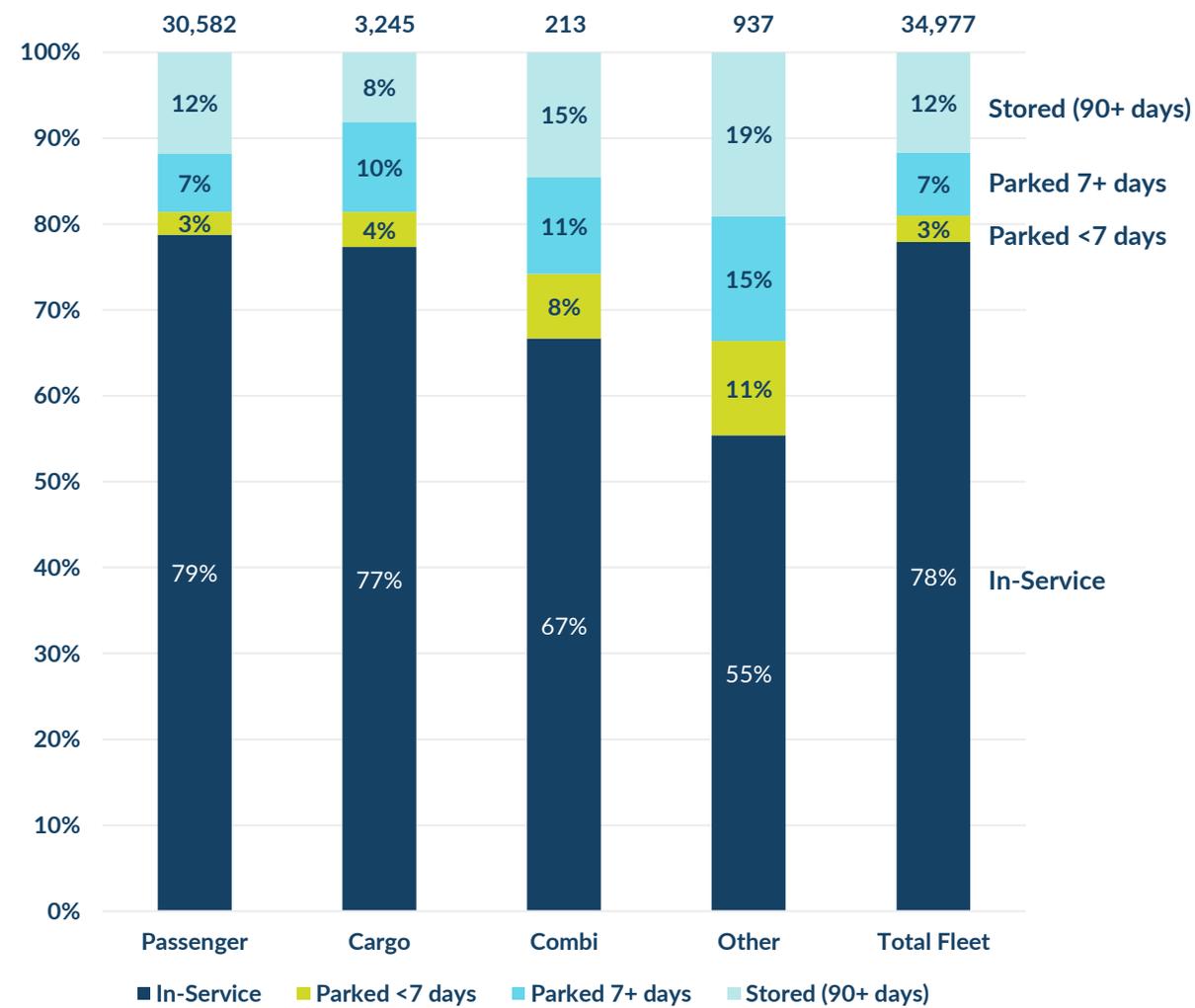
- ▲ Narrowbody aircraft such as 737NG/MAX and A320ceo/neo family have been vital to the traffic recovery and continue to lead with ~84% in active service (up from 82% in February), driven particularly by the domestic US, intra-regional flying, and China’s recovery
- ▲ Widebody aircraft continuing to climb back. ~79% are in active service (up from 76% in February), and this is a higher % than regional aircraft and turboprops
- ▲ Smaller regional jets (e.g., Embraer 145 family and CRJ200s) continue to struggle with a large proportion (~53%) of the fleet parked/stored. This is largely driven by airlines upgrading to larger aircraft (e.g., E-Jets, E2s, A220s) and relatively higher fuel prices

It makes sense that the newest technology aircraft are also most likely to be actively flying

Fleet Status by Aircraft Technological Maturity - Late May 2023
% Aircraft In-Service/Parked/Stored



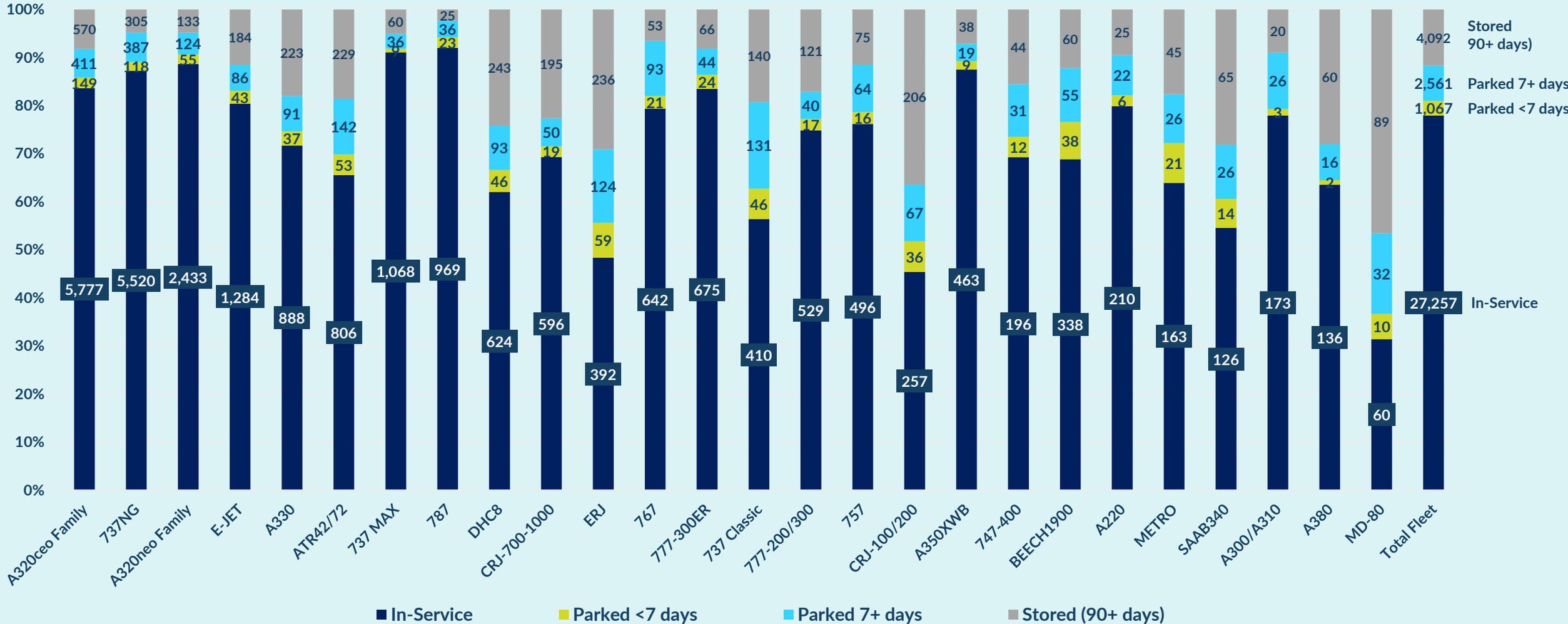
Fleet Status by Aircraft Role - Late May 2023
% Aircraft In-Service/Parked/Stored



Source: Aviation Week Fleet Discovery. May 2023. Naveo analysis

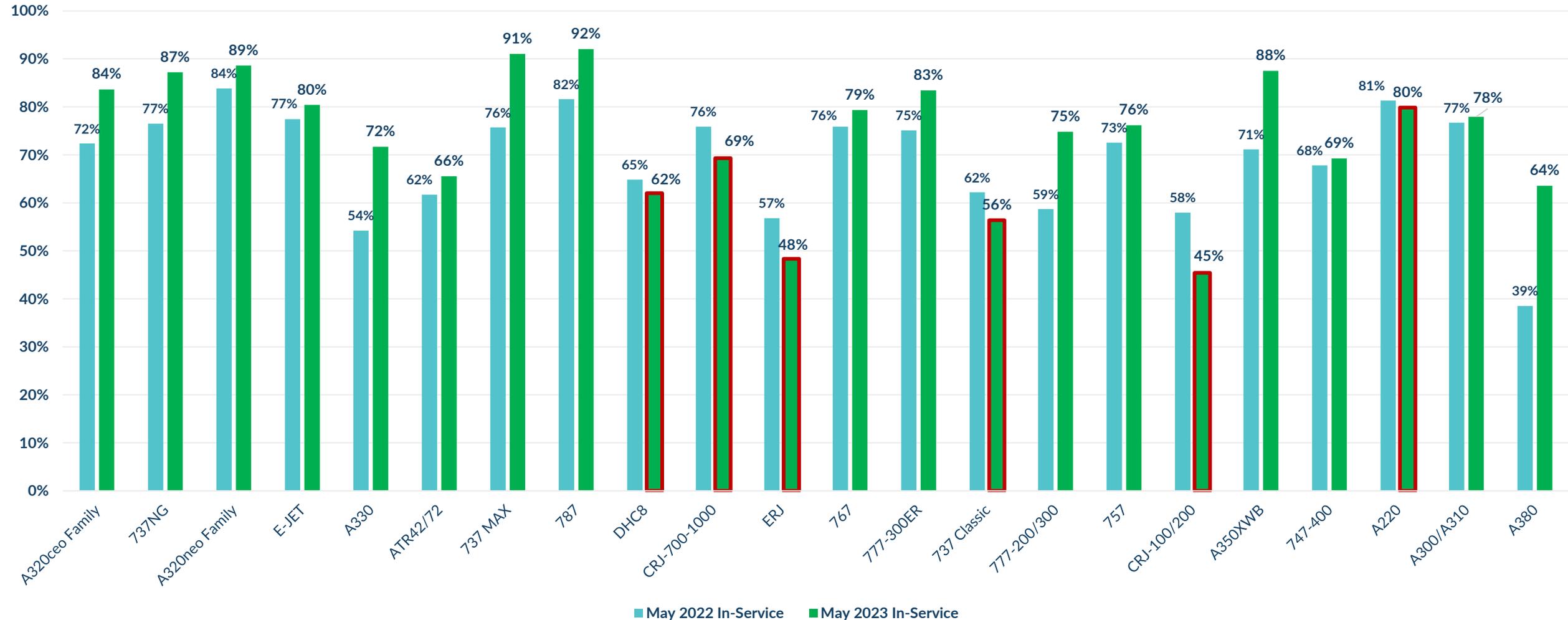
Top Air Transport Aircraft Families Fleet Status with Aircraft Quantities

Top Air Transport Aircraft Families Fleet Status – Late May 2023
 % Aircraft In-Service/Parked/Stored – Ranked By Largest Fleet Size Left to Right. Qty of Aircraft



Comparing the percentage of the fleet in-service with the last meeting, shows most aircraft families have a higher proportion of their fleet in-service in May 2023

% of Fleet In-Service. May 2022 versus May 2023

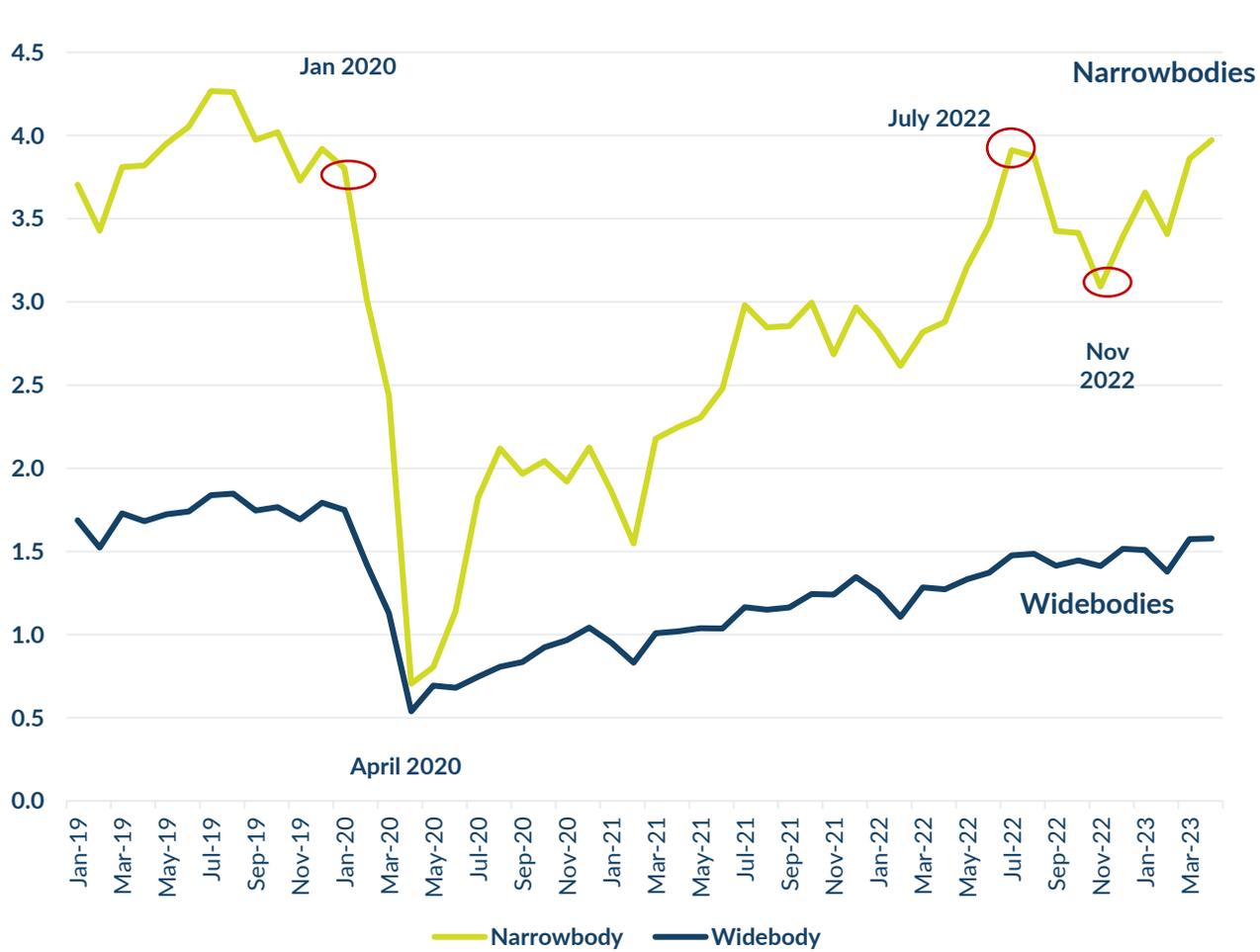


There are ~4,092 aircraft in storage (inactive for 90+ days)

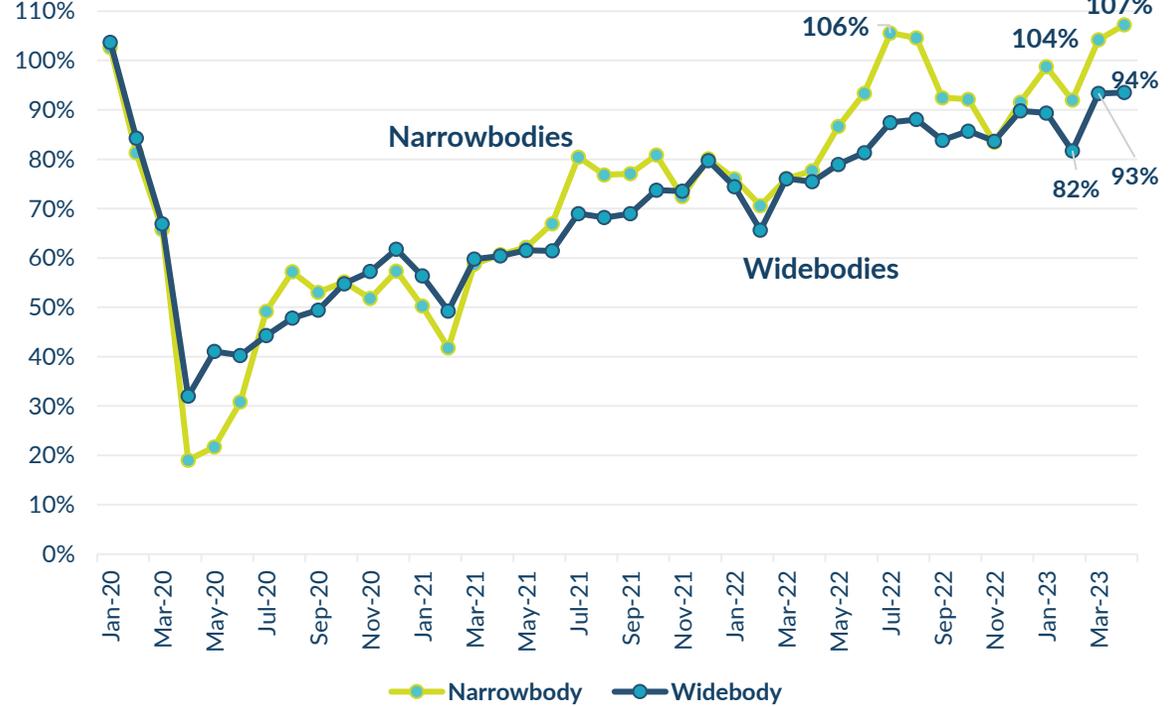


Narrowbody aircraft utilization is back above pre-COVID levels. Widebodies are getting close but continue to lag

Air Transport Monthly Flying Hours by Aircraft Size January 2019 to April 2023 (Millions Hours)



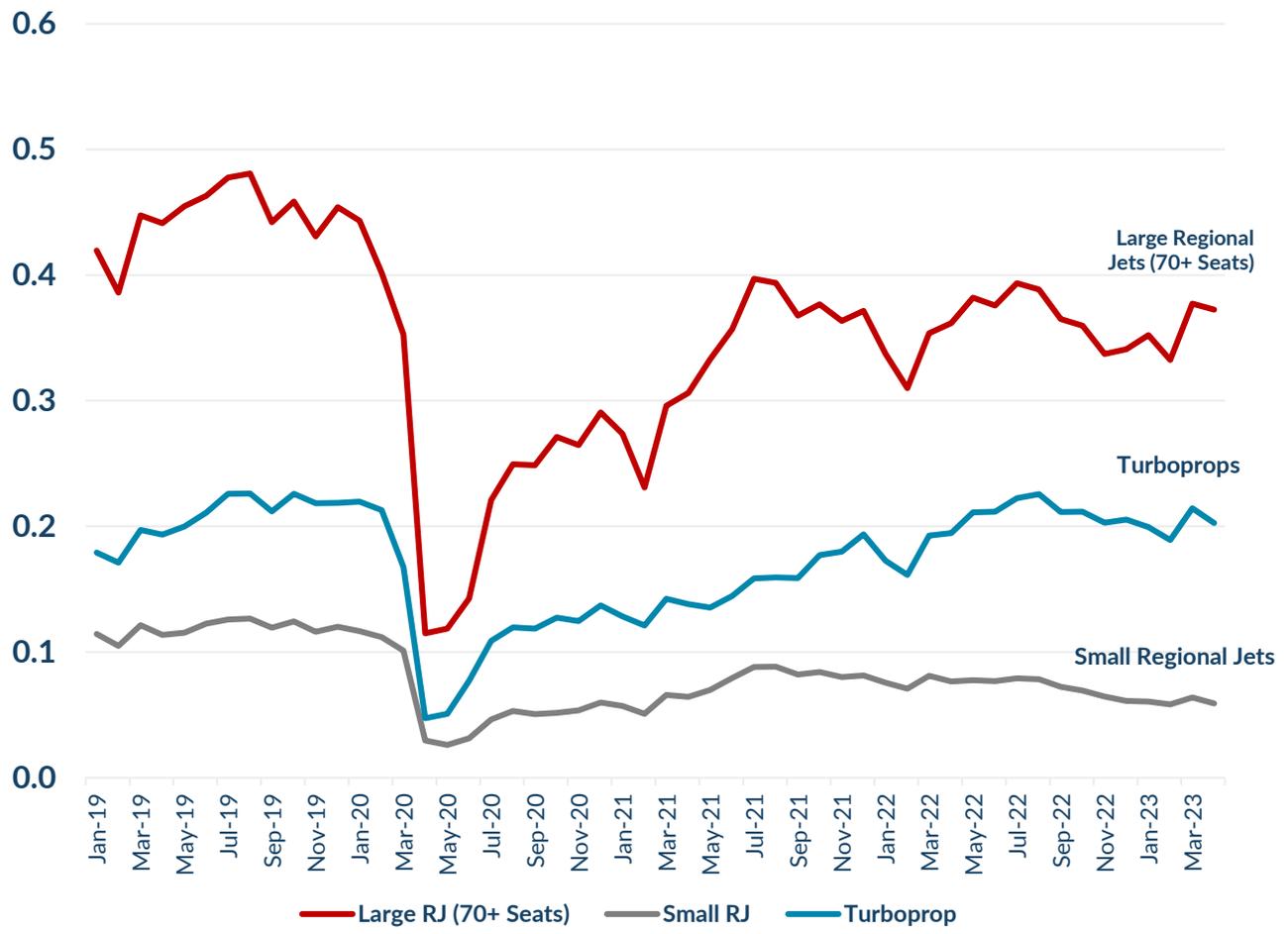
Air Transport Monthly Flying Hours by Aircraft Size January 2019 to April 2023 % of Same Month in 2019



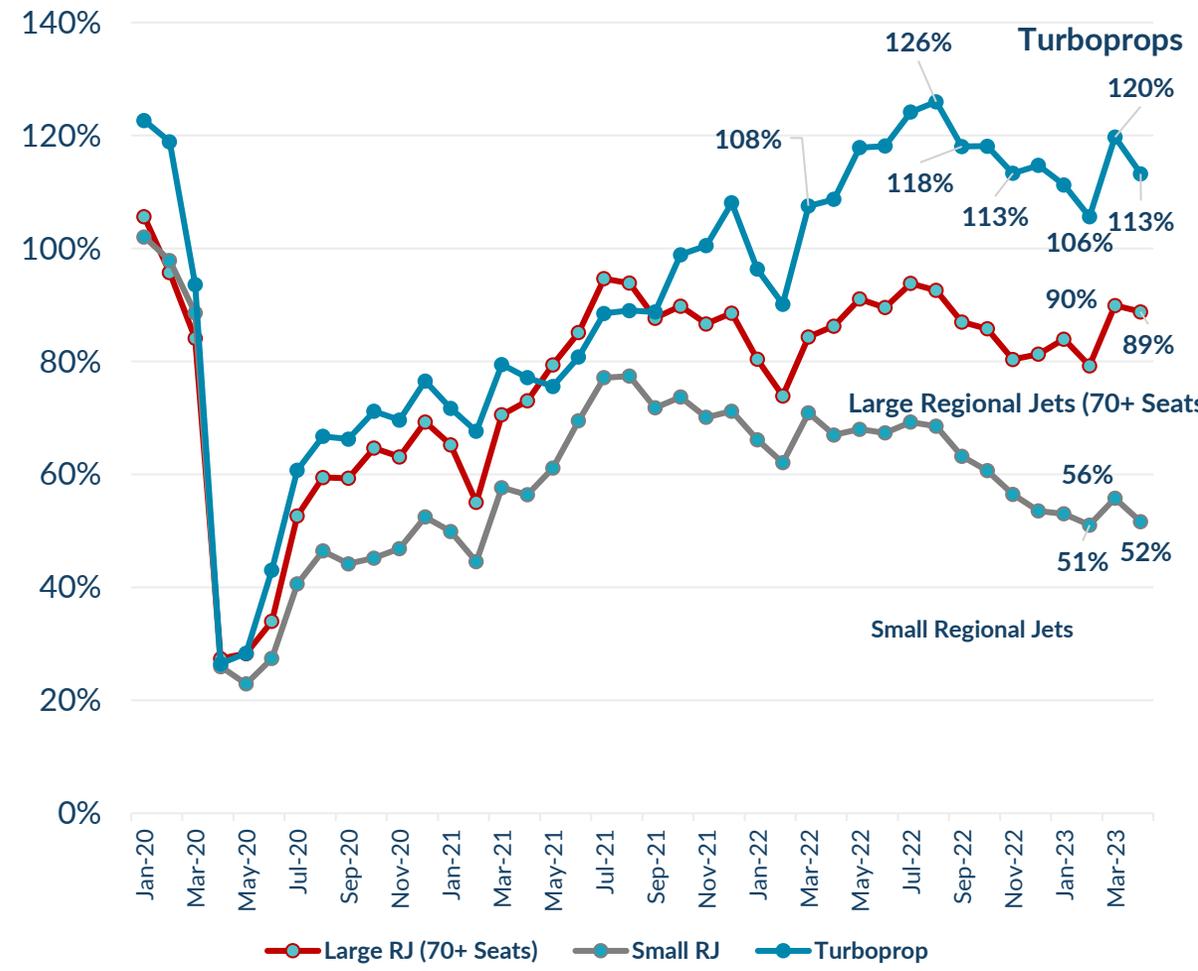
Source: Aviation Week Fleet Discovery. May 2023. Naveo analysis

Turboprops have led the regional aircraft recovery and are above pre-COVID flying hours. Larger 70+ seat regional jets aren't too far behind

Air Transport Monthly Flying Hours by Aircraft Size January 2019 to April 2023 (Millions Hours)

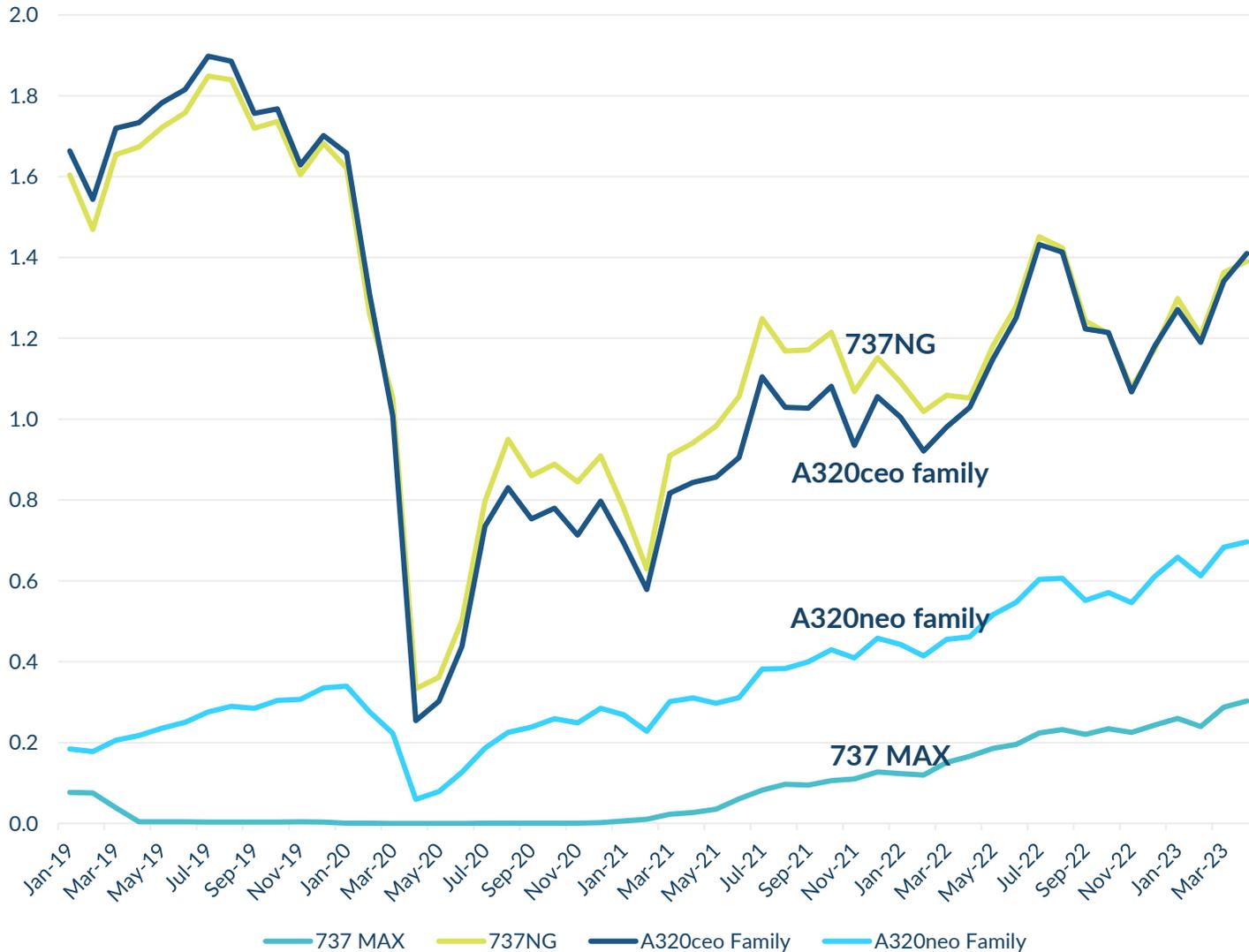


Air Transport Monthly Flying Hours by Aircraft Size January 2019 to April 2023 % of Same Month in 2019



Source: Aviation Week Fleet Discovery. May 2023. Naveo analysis

Global A320ceo/neo family, 737NG & 737 MAX Monthly Flying Hours
Jan 2019–April 2023 (Millions Hours)

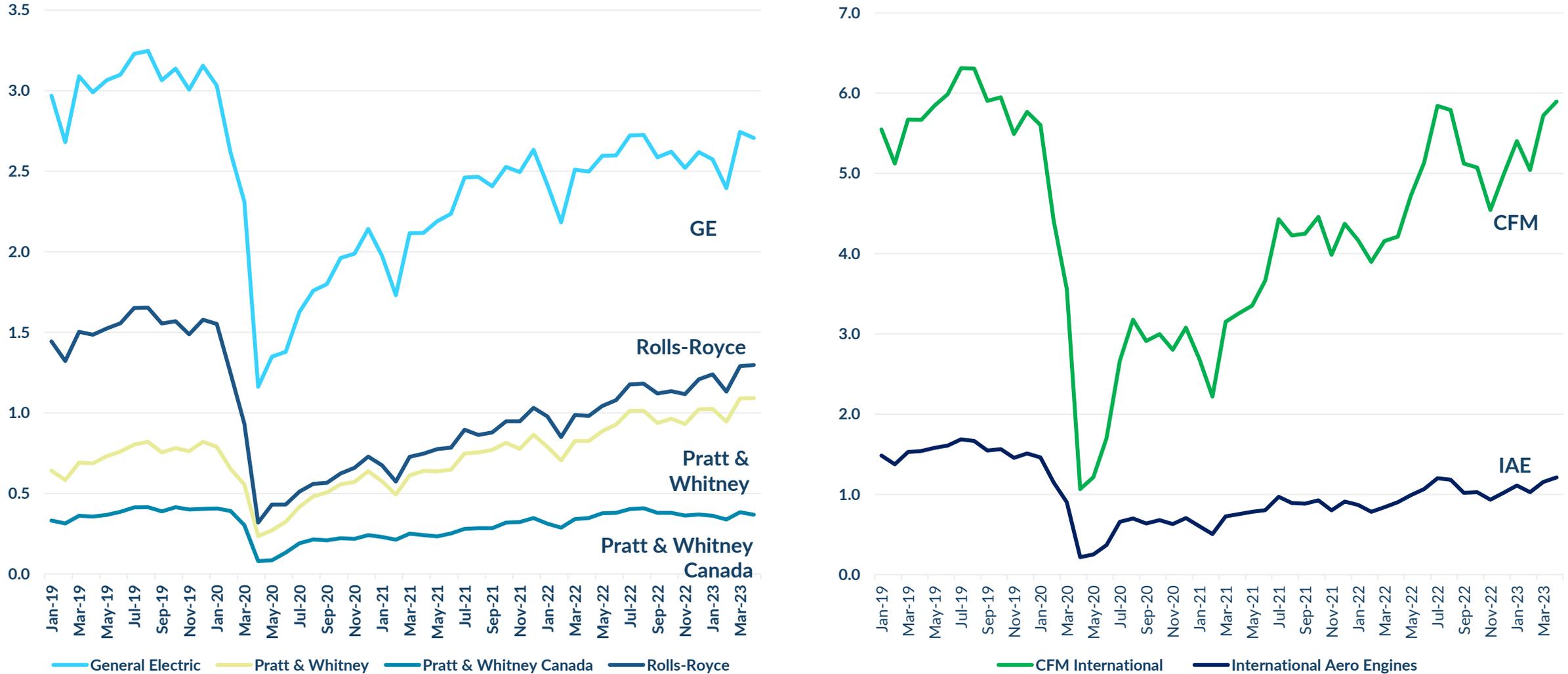


Flying hours of the key narrowbody aircraft continue to improve versus 2019 & 2021

- ▲ The 737NG and A320ceo family, the backbone of the Air Transport fleet, are the vital in-service narrowbodies driving the recovery. They account for ~38% of the current fleet
- ▲ It's pretty remarkable how the hours of the A320ceo family and the 737NG are now tracking each other so closely. There are ~5,520 737NGs in active service in May 2023 and 5,777 (!) A320ceo family aircraft, so the fleet is similarly sized
- ▲ Comparing April 2023 with April 2022, the A320ceo family is up 37%, and 737NGs are up 32%. 737MAX hours are up 82% in April 2023 against April 2022, and A320neo family are up 51%
- ▲ The A320neo family aircraft, due to deliveries, are currently doing 2.3 times the hours of the 737 MAX fleet

CFM, GE, and Pratt & Whitney have led the recovery in engine flying hours – boosted by a solid exposure to narrowbody and cargo aircraft

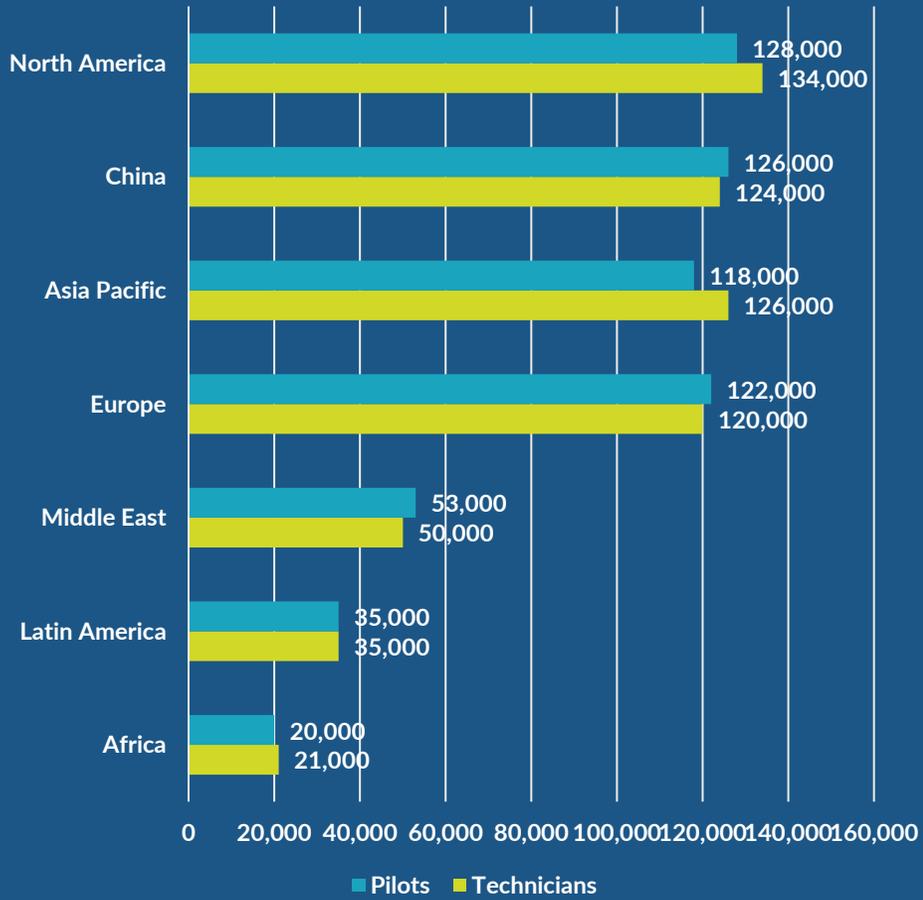
Air Transport Engine Monthly Flying Hours by Engine OEM Jan 2019- April 2023
(Millions Hours)



Air Transport Aircraft Retirements & MRO Outlook



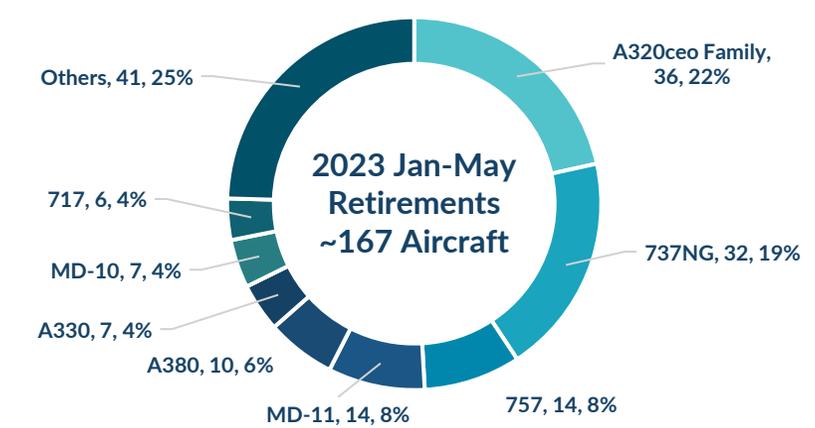
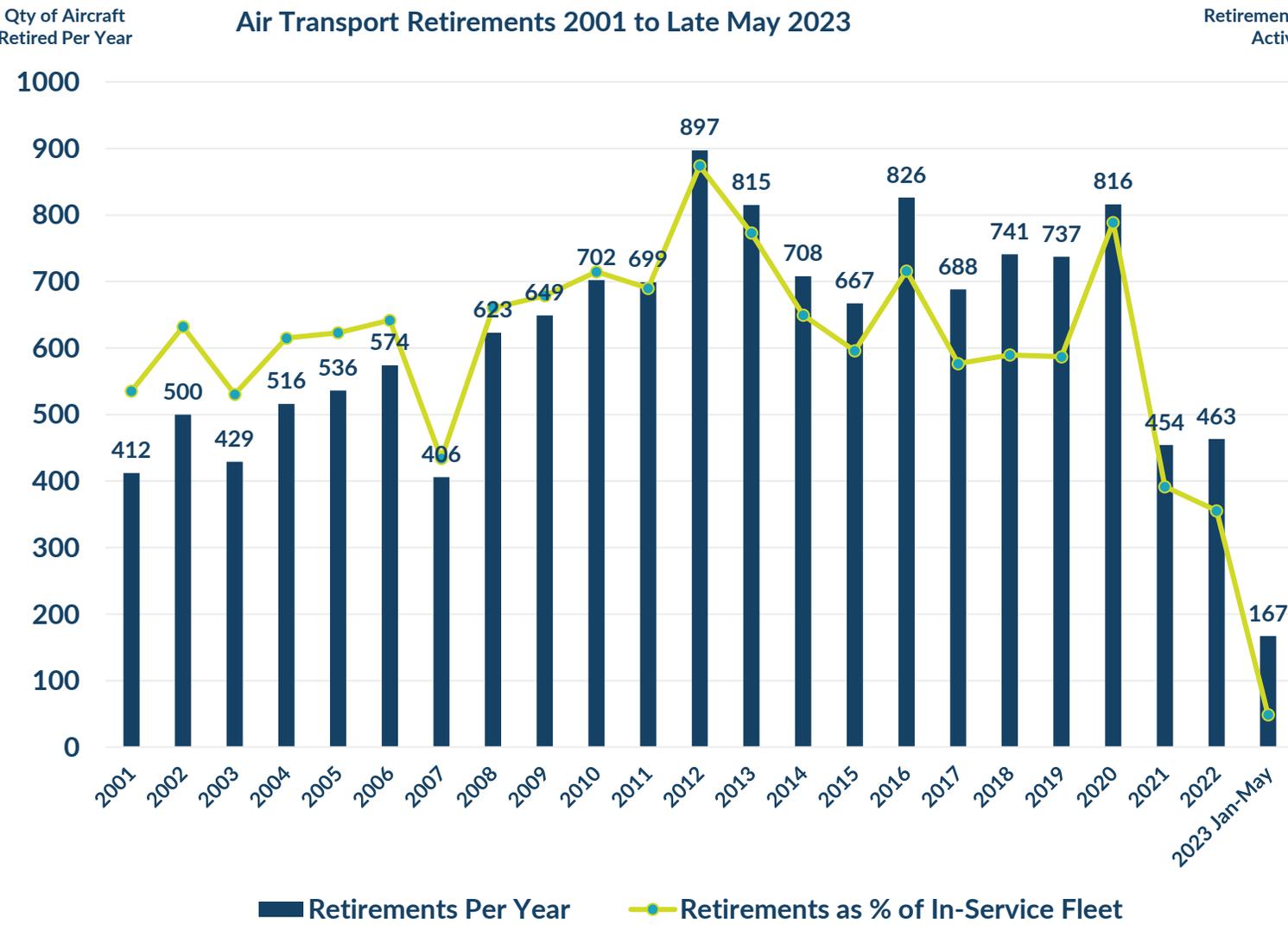
2022-2041 New Air Transport Pilot & Technician Demand



Labor supply hasn't been able to keep up with demand causing bottlenecks that are limiting the recovery across the MRO industry

- ▲ The most significant issue facing aviation today is the shortage of skilled, experienced labor such as technicians, engineers, pilots, cabin crew, and airport workers
- ▲ Global staff shortages and difficulties reactivating aviation infrastructure and assets are leading to flight cancellations in various parts of the world, holding back recovery in North America and Europe
- ▲ Approximately 2.3 million aviation-related jobs have been lost globally due to COVID, which equates to a ~21% workforce reduction. Some areas were impacted more than others. There has been a ~29% fall in contracted airport workers, such as ground handlers
- ▲ Experienced employees decided to retire early or reduce their hours. Others have left aviation altogether and are not returning
- ▲ The industry needs to attract talent and put in place robust training plans to cover employee growth requirements and attrition
- ▲ Asia Pacific has forecasted demand for 126,000 new maintenance technicians over the next 20 years. China has a demand for 124,000

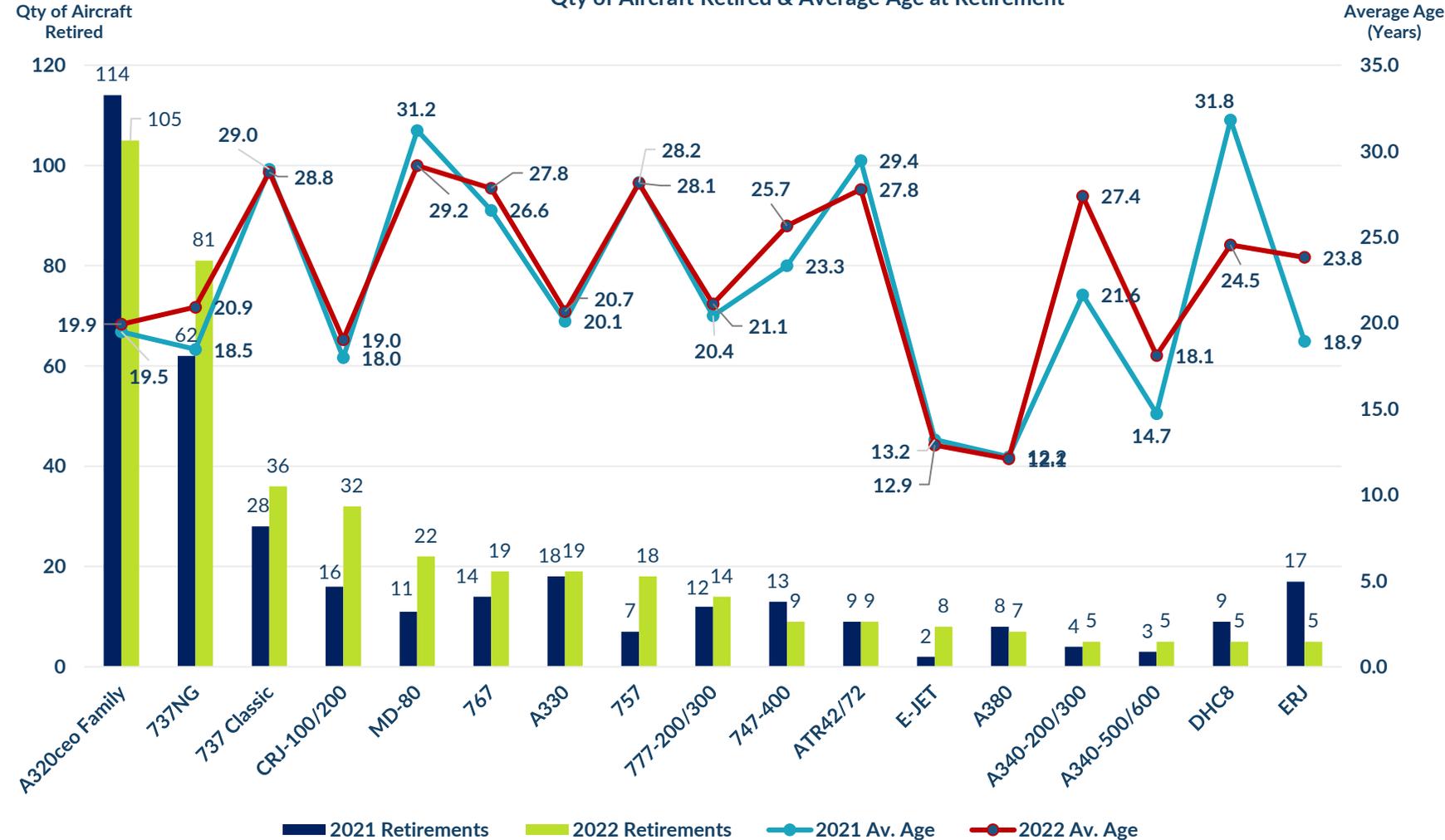
~463 air transport aircraft were officially retired in 2022. So far, in 2023 ~167 aircraft have retired by Late May



Source: Aviation Week Fleet Discovery May 2023. Naveo analysis

The average age of the ~463 aircraft retired in 2022 was 24.7 years slightly up on 2021

Top 17 Air Transport Aircraft Retirements in 2022 vs 2021
Qty of Aircraft Retired & Average Age at Retirement

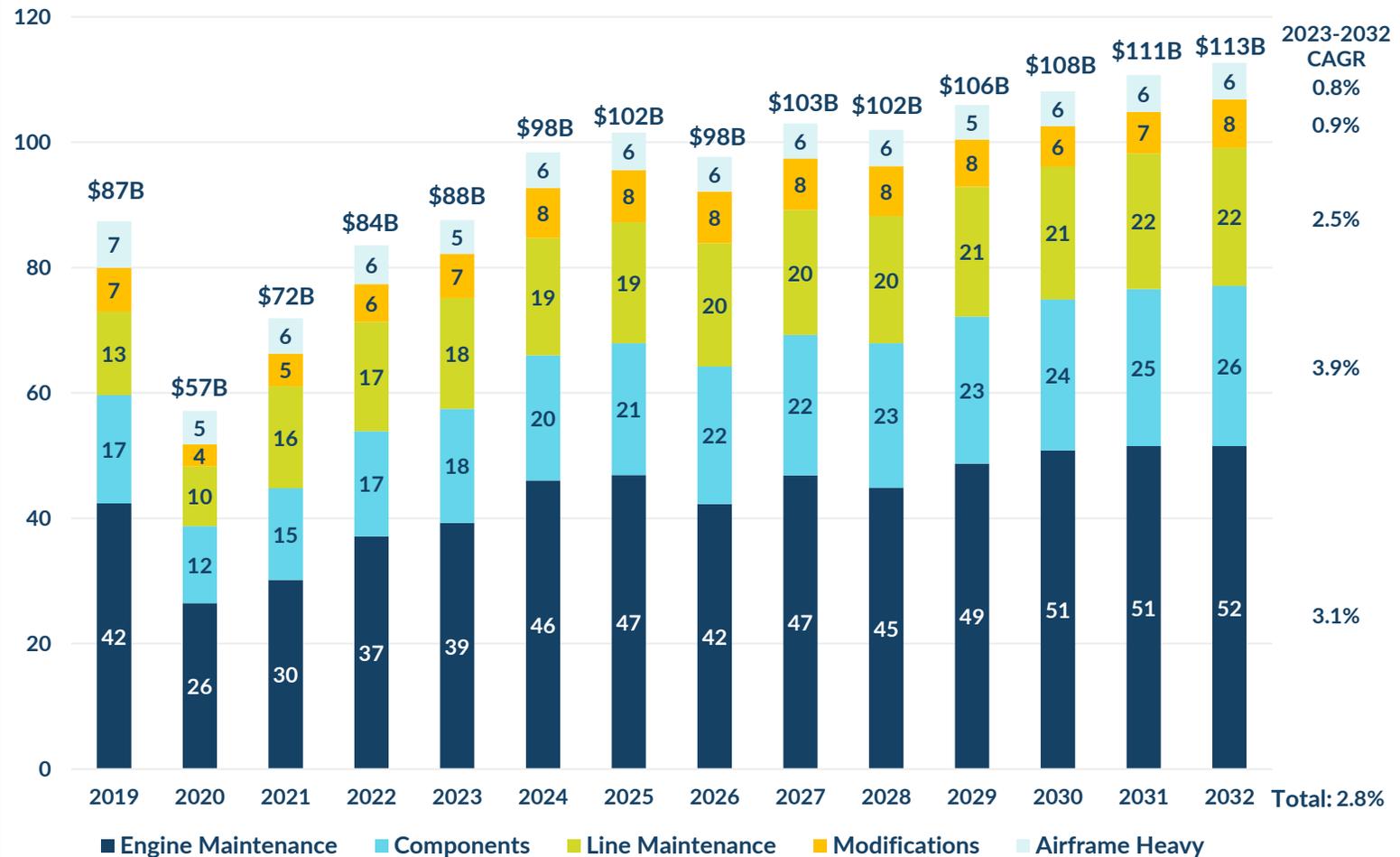


- ▲ The average age of the ~463 aircraft retired in 2022 was 24.7 years. This compares to 24.3 years for 454 aircraft retired in 2021
- ▲ In the 2000s, the average age of retired aircraft was ~27.9 years. 2012 to 2019 saw the average age of retired aircraft hover between 24.7-25.3 years
- ▲ Some retired aircraft had long lives (e.g., the MD-10s retired by FedEx had an average age of 42 to 43 years)
- ▲ However, the retired Embraer E-Jets had an average age of 11 years, and the retired A380 ~11.5 years
- ▲ The 443 737NGs that have been retired had an average age of 18.3 years, and the 1,074 A320ceos retired so far had an average retirement age of 19.4 years

MRO spend should return to pre-pandemic levels by 2023

- After years of impressive aftermarket growth, the 2020 MRO market was down ~35% despite a solid first quarter as airlines grounded most of their fleets by the start of Q2
- The impact on the different types of MRO activity varied depending upon the levers that airlines can pull to reduce the expense
- As airlines are in cash conservation. Where possible, operators will consider using green-time engines in-lieu of an immediate shop visit, USM, or DER repairs
- The MRO market is forecasted to reach \$88B by 2023, exceeding 2019 pre-COVID levels
- 2023-2032 CAGR growth (constant 2022 \$) is forecasted to be 2.8%
- Airframe maintenance is forecasted to grow slowest (0.8%) due to the retirement of maintenance-intensive aircraft and their replacement by less maintenance-intensive aircraft. Line maintenance is forecasted to grow at 2.5%, modifications at 0.8%, and engine MRO at 3.1%
- The fastest-growing segment is components which are forecasted to grow at 3.9%

Air Transport MRO Market Forecast, 2019-2032 By MRO Category
(All Air Transport Aircraft) – Forecast in Constant 2022 US\$



Source: ICF, Aviation Week. Naveo analysis. Constant US\$. Forecast from 2023 in 2022 \$



Considerations

The recovery from COVID-19 is well underway



Impact of COVID:

- ▲ Air travel recovery is progressing well, and we'll likely achieve pre-COVID capacity levels during 2023
- ▲ The legacy of COVID is still being felt via labor and production issues which are critical issues impacting OE and MRO. Skilled labor is in short supply (a trend we've all been aware of for years but which COVID has accelerated)
- ▲ MRO demand has recovered quicker than supply (labor and parts) can support. This has resulted in very long production, and MRO turn times and tight capacity
- ▲ Aircraft retirements have remained low. Therefore, USM is in short-supply
- ▲ Displacement of the workforce due to furloughs, layoffs, and wage inflation is impacting the ability of companies to retain and recruit talent
- ▲ E-commerce growth has been strong. Supply of cargo conversion capacity is increasing to meet demand, with new PTF locations coming online (particularly for narrowbodies). There are signs of some softness in the cargo market, driven by the economic slowdown and slowing consumer demand

OE and MRO suppliers have struggled to meet demand



Geopolitics, Production & MRO Issues

- ▲ Geopolitical tensions (e.g., with Russia and China) are encouraging the redrawing of supply chains to consider re-shoring and in-sourcing
- ▲ Rising inflation and higher interest rates increase the cost of labor, material, transportation, and energy costs
- ▲ The US dollar has also strengthened relative to other currencies
- ▲ Material catalog price increases (e.g., 10%+) have been seen, increasing costs for OEM and MROs
- ▲ Working Capital and liquidity are challenged. Many suppliers, particularly in Tier 2/3, have been starved of cash (including from years of airframe/engine/system OEM cost reductions required to avoid the “no-fly list”)
- ▲ Squeezed for Margin over the past decade by airframers, engine OEMs, and system suppliers, financing the production ramp-up continues to be challenging
- ▲ Production issues in castings, forgings, microchips, chemicals, and engineered components impact OE deliveries and MRO. Suppliers doubt their ability to meet desired airframe OEM production ramp-up expectations
- ▲ Engine in-service reliability issues have resulted in hospital visits and competition material and engine induction slots



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- ▲ Independent revenue and margin commentary
- ▲ Expansion growth vectors
- ▲ Potential bolt-on acquisitions (or divestitures)
- ▲ Exit considerations



Air Transport



Business Aviation



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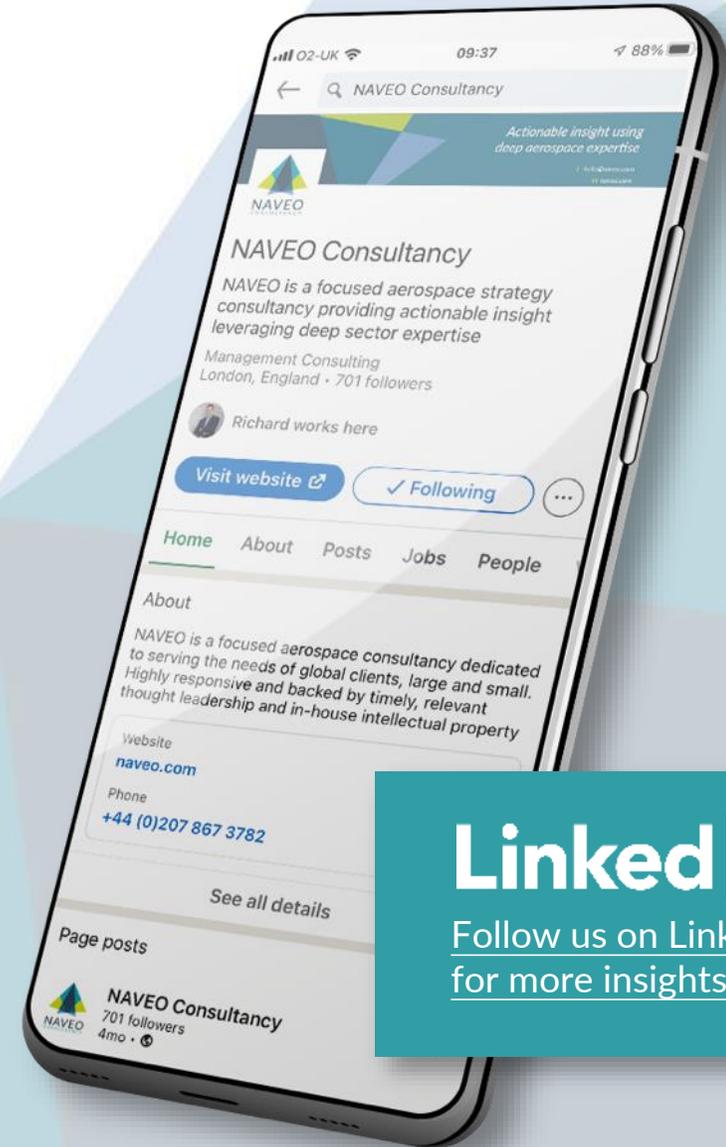
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