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## The Airhive

BY AIRWAYS [📅](#) NOVEMBER 16, 2023 [🕒](#) 10 MINUTES READ

**DALLAS** — In a week when Boeing took the lion's share of Dubai Airshow orders, [Aviation Values](#)' Head of Commercial Analysts, Gary Crichlow, shared his data insights on the Boeing 737 MAX.

The article, which we share here as is as we believe it is of interest to our readers, covers the Boeing 737 MAX family production rates, inventory, liquidation, and an in-depth analysis by the ISTAT Certified Appraiser. Mr. Crichlow will argue, based on an analysis of historical production and deliveries as well as the MAX backlog, that:

- While Boeing has made substantial progress in clearing its MAX inventory, it will be quite a challenge to meet its stated target by the end of next year. At current average liquidation rates, we believe the end of 2026 is more realistic
- The MAX 10, alongside the MAX 8, is likely to be the dominant MAX types
- Certification and entry into service of the MAX 10, even more so than the MAX 7, is absolutely crucial to the MAX finally getting its big break



At DAS2023, Boeing and Ethiopian Airlines announced the carrier agreed to order 11 787 Dreamliner and 20 737 MAX airplanes with an opportunity for 15 and 21 additional jets, respectively. Image: Boeing

## 737 Historical Production Rates

AviationValues tracks every commercial aircraft worldwide, from its first flight onwards. By looking at every Boeing 737's first flight information (both Next Generation and MAX families), we can build a picture of 737 production over the past 10 years.

Clearly, there are some limitations in terms of including aircraft that may have rolled off the assembly line but not actually flown. With that caveat, the overall picture of our analysis shows good alignment with production comments made by the manufacturer during investor presentations and earnings calls over that period.

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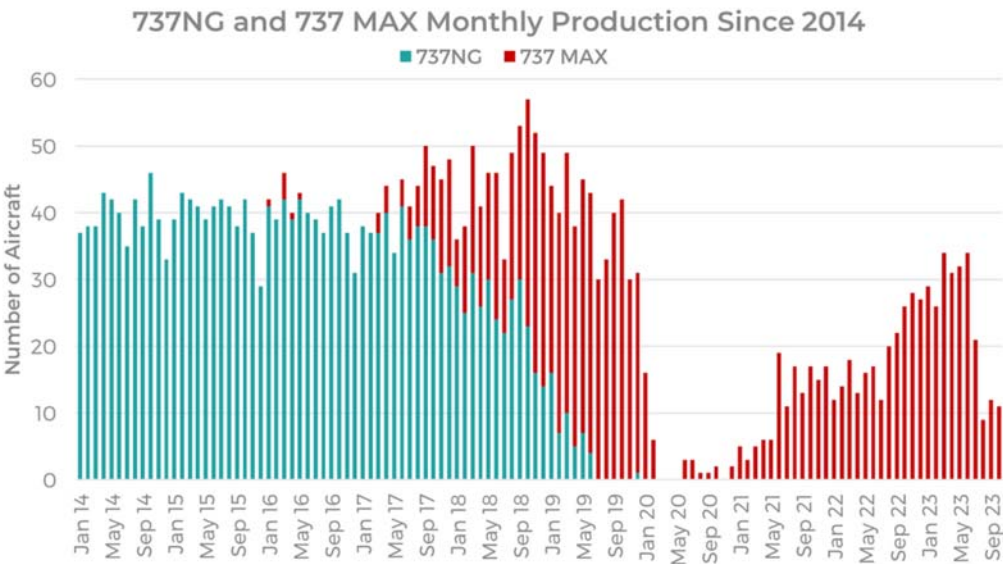
The data shows a relatively smooth ramp-up of MAX production from 2017, with the MAX gradually taking over the assembly line volume as the Next Generation deliveries wound down. Boeing's comments during that period reflected confidence that it would achieve a target of 57 per month by 2019.

The grounding of the MAX in 2019 resulted in an adjustment rather than a pause in production, as at the time Boeing anticipated a relatively short interruption of its delivery schedule. However, the COVID-19 pandemic necessitated a dramatic reduction in production rates in 2020.

The recovery has not been smooth, beset by the challenge of regaining certification to fly in all of the MAX customers' markets. The US was the first to clear the aircraft in November 2020; China was the last major market to do so in December 2021.

In its most recent earnings call, the manufacturer stated it had achieved 31 aircraft in April 2023 (a figure corroborated by our data) with a target of 50 aircraft a month by 2025–26. However, since then, quality control issues related to MAX fuselages manufactured by Boeing's supplier, Spirit AeroSystems, have significantly hampered Boeing's efforts to increase production and delivery rates in the latter half of 2023.





Source: AviationValues November 2023



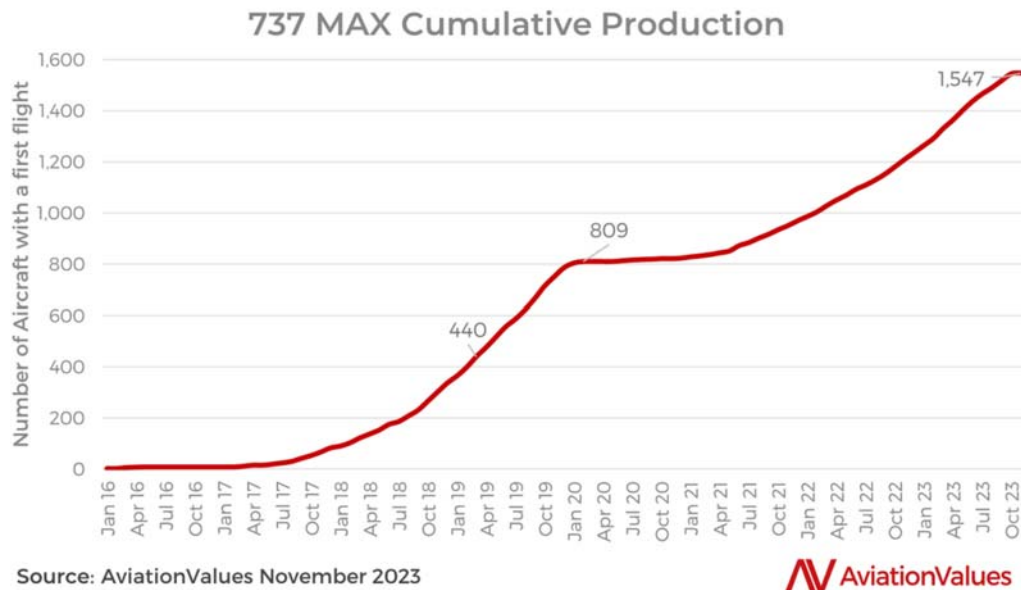
Year	737 MAX average monthly deliveries	737NG average monthly deliveries	Total 737 average monthly deliveries	Boeing investor comments
2014		39	39	Boeing stated in investor presentations that they reached 42 737NG production rate in April with target of 47 by 2017
2015		40	40	Power-on completed for first 737 MAX. Boeing announced plan to increase total 737 production rate to 52 by 2018
2016	<1	39	40	737 MAX first flight achieved. Planned production rate increase to 57 by 2019
2017	6	37	43	First 737 MAX deliveries. Boeing stated a total 737 production rate of 47 was achieved in Q2
2018	21	25	46	Boeing stated in its 3Q earnings call that it achieved a 737 production rate of 52, with target of 57 in 2019
2019	35	8	39	Production rate adjusted from 52 to 42 to accommodate pause in MAX deliveries. Ramp-up target of 57 delayed to late 2020
2020	3		3	1Q earnings call stated that c. 450 MAX built and stored. "Low rate" of production anticipated during 2020 and rate of 31 expected in 2021, assuming MAX return to service in 3Q 2020.
2021	11		11	3Q earnings call stated a production rate of 19 and reaffirmed target of 31 by early 2022

Source: AviationValues November 2023

 AviationValues

## 737 MAX Inventory Trend Analysis

In total, we tally a total of over 1,500 737 MAX passenger aircraft that have achieved a first flight.



In addition to tracking each aircraft's first flight, AviationValues also records every aircraft delivery: the delivery date, registration, owner and operator, as well as the aircraft's flight activity and trading history for the remainder of its life. This information drives our automated valuation algorithms that provide a daily refreshed view of the aircraft's current and forecast values.

By comparing monthly production (measured by the number of aircraft that first flew in each month) to monthly deliveries, we can build a picture of the number of aircraft remaining on the ground, having rolled off the assembly line but not yet delivered.

Our analysis indicates that there are currently net 224 MAX commercial passenger aircraft that have recorded a first ADS-B flight signal but have not yet been delivered. This is down from a peak of 435 aircraft in late 2020.

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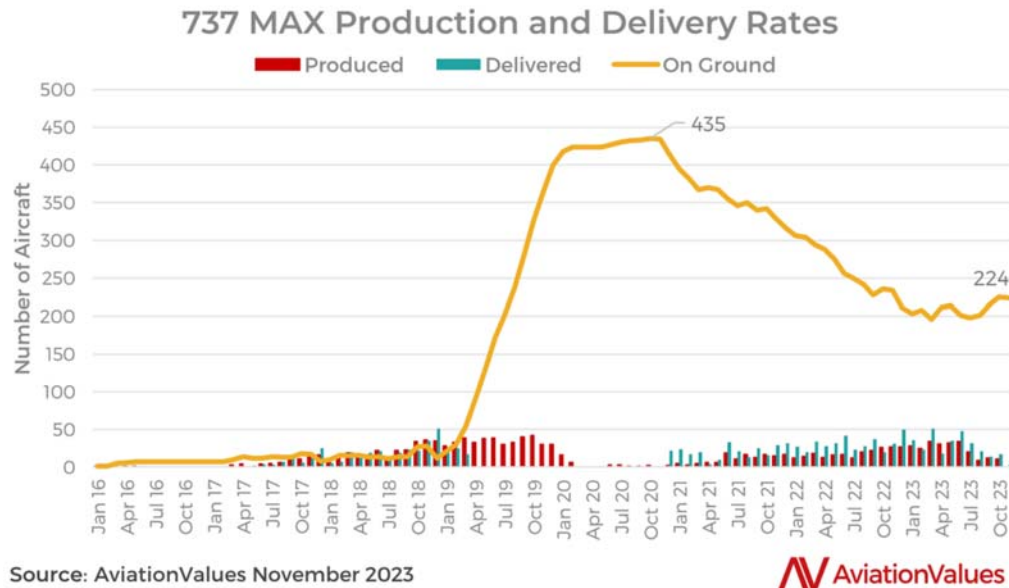


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In its most recent earnings call, Boeing stated that the third quarter of 2023 ended with “approximately 250 MAX airplanes in inventory.” Allowing for aircraft that would have rolled out of the Renton assembly line and been parked onsite without a first flight, as well as corporate-configured BBJs (Boeing Business Jets), there is good agreement between our analysis and Boeing’s figures.

Boeing’s progress in clearing its inventory since the first MAX ungroundings in late 2020 is clear. However, that progress has stalled in recent months, largely as a result of supplier issues relating to the aft pressure bulkhead. With more than half of the inventory still to go, Boeing has a tall order to meet its target of completing its liquidation by the end of 2024.

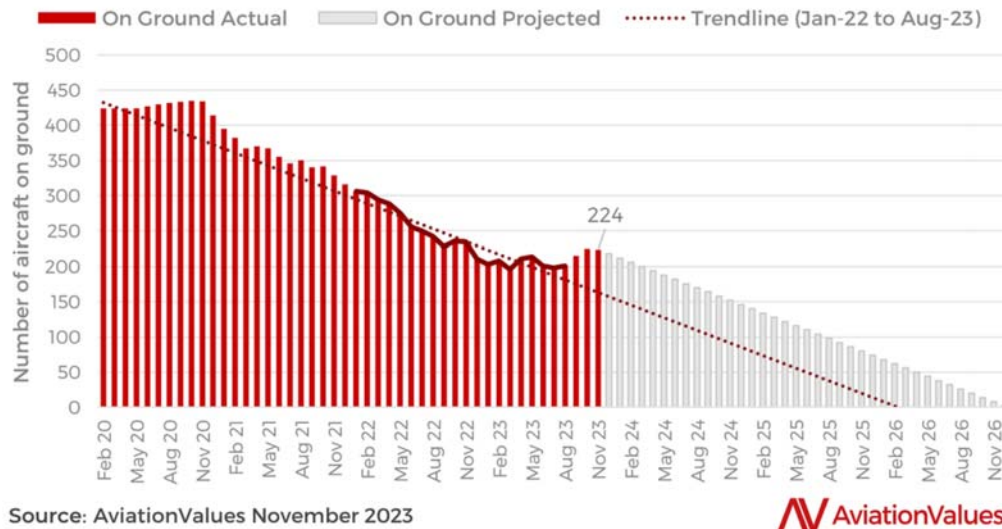




## Looking Ahead: Focus on Liquidating the MAX Inventory

In its latest round of reporting, Boeing has reiterated that its key focus in the near term is to deliver all of its remaining inventory of 737 MAX aircraft (as well as its 787 inventory, which has also experienced challenges). The target is to deliver most, if not all, by the end of 2024. Based on the progress Boeing has managed to date, our analysis of the on-ground MAX fleet indicates that this would be quite a feat.

## 737 MAX inventory liquidation analysis



We start by using our data on the net on-ground MAX fleet as a proxy measure for the total inventory. We have then focused on the liquidation that Boeing has achieved between January 2022 and August 2023. Our line of reasoning is that the MAX had been recertified in all the major global markets only after December 2021; the more recent aft-pressure bulkhead issues surfaced at the end of August 2023. Therefore, our closest approximation to a “typical” liquidation rate is between January 2022 and August 2023; it works out to six aircraft a month.

We have then applied this representative liquidation rate to our current tally of 224 on-ground aircraft and projected forward. Our conclusion is that barring a dramatic increase in inventory aircraft being taken up, the inventory ought to be substantially cleared by the end of 2026.

A major caveat: our analysis is based on a trend during a period when an average of 19 to 20 aircraft were rolling off the assembly line per month. Over our projection period, Boeing intends to not only double that to 38 aircraft but further increase it to 50. The expectation is, of course, that all those aircraft will be immediately delivered. Managing

that project would be enough on its own for any manufacturer, let alone maintaining progress in inventory reduction. Boeing's stated target of near-zero inventory by year-end 2024 requires dramatically greater momentum: a reduction of approximately 17 aircraft per month. It is a tall order, to say the least.

Of course, there are many variables and as yet unforeseen happenings that could help Boeing better this projection.

The latest news reports indicate that Boeing has significantly streamlined the aft pressure bulkhead inspection process to identify which aircraft require rework. Hopefully, this will help it get things moving again. We would point out, though, that, even if the quality control issues had not arisen, a net liquidation rate of six aircraft per month would still result in a near-zero inventory only towards the end of 2025.



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A resumption of deliveries to China would certainly go a long way: Boeing has reportedly reassigned 55 inventory aircraft from Chinese carriers to Air India, but a sizeable portion of the inventory remains earmarked for China. All eyes are on the Asia-Pacific Economic Cooperation (APEC) mid-November meeting in San Francisco. News reports indicate a possible thawing of relations that could enable a resumption of deliveries. At the time of writing, it remains to be seen how and when a resolution in current US-China geopolitics will arrive. What is clear is that it is a critical wildcard in Boeing's liquidation strategy.

In summary, the only realistic way we see to achieve Boeing's target timeframe is via a large-volume inventory sale, together with a resumption of significant deliveries to China. Timing-wise, Boeing has limited influence on the former (outside a major price cut?) and no control over the latter.



Chip hanging out with Chester on his new Boeing 737-9 MAX. Photo: Brandon Farris/Airways

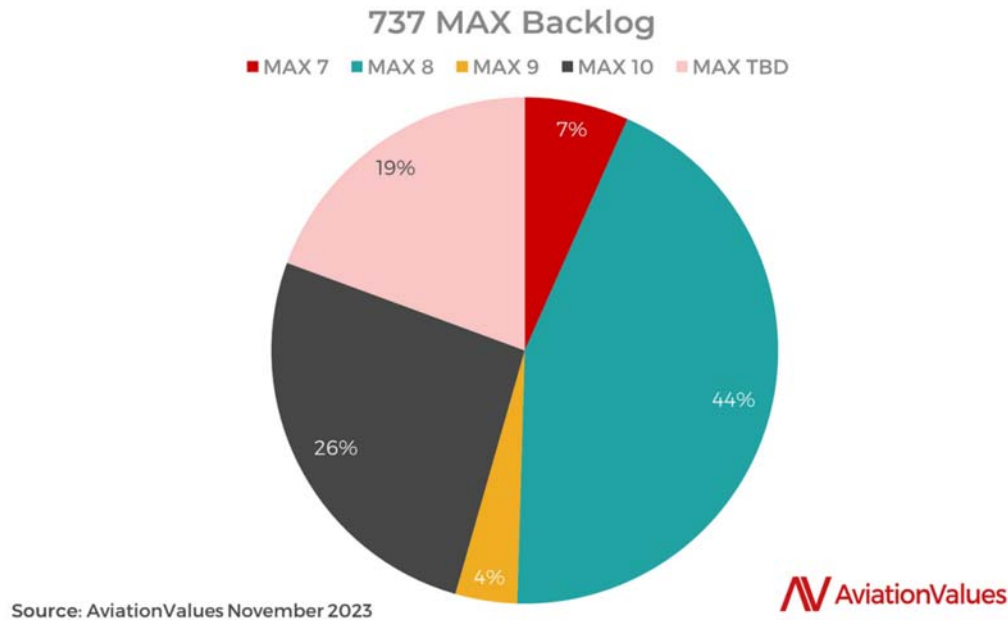


## Recovering Lost Ground: Focus on Rounding out the MAX Family

The second area of focus is bringing the MAX 7 and MAX 10 through the certification phase and commencing deliveries.

At present, the MAX 7 is understood to be closer to its entry into service and is expected in 2024, according to Boeing guidance. That said, the manufacturer has stressed that the timeline is ultimately dependent on the Federal Aviation Administration. Boeing currently anticipates certification and first delivery of the MAX 10 to be achieved in 2024, presumably with a later entry into service date than the MAX 7.

The backlog of the 737 MAX family is shown below.



Clearly, the MAX 8 is currently very much the dominant type. Included in the tally is the MAX 8 200, which incorporates an extra pair of exits to enable higher-density seating of up to 202 passengers.

The MAX 8 backlog overshadows the MAX 9 by more than an order of magnitude; in some ways, history appears to be repeating itself. The 737-900ER had never seemed to be as highly favored as the 737-800 on the one hand, and its delayed entry into service cost its competitiveness to Airbus' A321neo on the other. The MAX 9 clearly has a niche, although it remains to be seen how that niche will evolve over time.

The MAX 7 is enjoying greater success, although at present it is almost exclusively a Southwest Airlines aircraft. We discuss Southwest's plans for the MAX in greater detail in our comparative analysis of the US and China aviation markets in conjunction with Spire Aviation [here](#).

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The future standout really is the MAX 10: it is proving popular thus far, with good representation amongst full-service carriers such as Delta Air Lines, Qatar Airways, and Air India; low-cost carriers such as Ryanair and flydubai; and direct orders from lessors such as Aviation Capital Group and AerCap.

We believe the MAX 8 and MAX 10 will be the most important MAX variants to Boeing. The first announced order from the Dubai Air Show appears to support this view: SunExpress' firm order of 45 MAXs splits 28:17 between the MAX 8 and MAX 10, plus another 45 options.

We would even go so far as to say that the MAX 10 is crucial to the long-term success of the MAX family. Currently, Boeing advertises the MAX 10 as “the most profitable large

single aisle.” While it means “most profitable” for its customers, if the experience of Boeing’s rival in Toulouse is anything to go by, the MAX 10 should be the most profitable aircraft for Boeing as well. That assumes that our expectations are correct—that the MAX 10 will sustain a higher purchase price than its smaller siblings while taking advantage of the commonality in assembly and tooling.

The MAX 10’s direct competitor, Airbus’ A321neo, has had the competitive playing field for high-capacity single-aisle aircraft largely to itself. Such has been the demand that A321neos are now the largest share of Airbus’ single-aisle backlog. (We explore the single-aisle competitive landscape in our contribution to the publication AirInsight’s analysis [here](#)). Boeing has catching up to do, and it might just be on the wings of the MAX 10.



Aerolineas Argentinas Boeing 737-8 (LV-HKU). Photo: Alberto Cucini/Airways

## Conclusion

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The 737 MAX has come a long way from its dark days of 2019 and 2020. It's clear that the market has accepted it, and Boeing is making much-needed progress. That said, there is still a lot of lost ground to recover.

Our analysis indicates Boeing's target of clearing its inventory by the end of 2024 will be a difficult one to meet at its 2024 target production and current delivery rates. An opportunistic large-volume purchase and the resumption of significant deliveries into China would almost certainly be required in the next 12 or 13 months. Since Boeing has limited influence over the timing of either of those occurrences, we believe the end of 2026 is more realistic.



The criticality of recovering lost ground also applies to the rounding out of the MAX family. While the certification of the MAX 7 appears to be imminent, the entry to service of the MAX 10 is, in our view, really where the opportunity is. The market certainly appears to be responding positively, and the MAX 10 looks set to be a mainstay of the MAX family alongside the MAX 8.



As the largest and potentially most profitable MAX variant, it is crucial for Boeing to enter the high-capacity single-aisle market, long surrendered to its rival, as soon as it can. Only then, we believe, can the MAX be said to have finally caught its big break.

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Data as of November 2023.

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Featured image: Boeing 737-8 during flight. Photo: Boeing

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