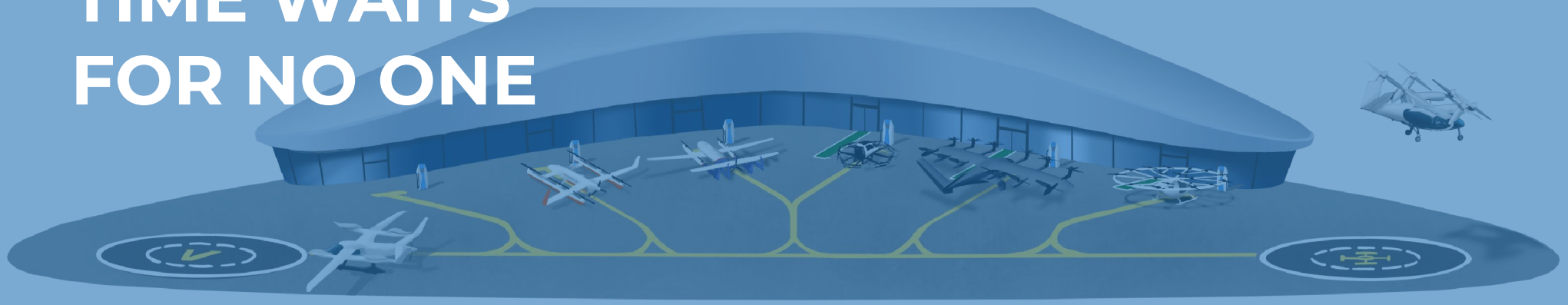
TIME WAITS FOR NO ONE



Are 2024 and 2025 Entry Into Service dates feasible for the eVTOL front runners in Advanced Air Mobility?

2024 will be a crucial year for the front runner eVTOL OEMs working on the public roll out of their air taxi services in 2024 and 2025.

With 2023 coming soon to a close, we examine the publicly announced milestones - mixed with some of our projections - for three OEMs - Archer, Joby Aviation and Volocopter (reported in alphabetical order through the research note) - to understand what is the risk to their respective EIS and understand what is the likelihood that they will make the announced dates.

> **2024 will be a crucial year for the front runner eVTOL OEMs**

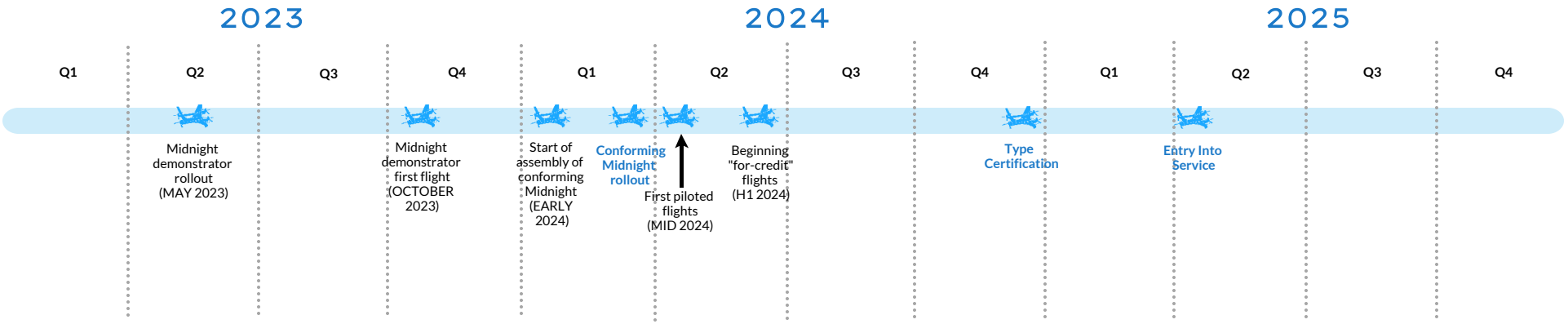
The analysis starts by building the program schedule for the 2023-2025 timeframe for each OEM using the OEM announced milestones and SMG Consulting projections. We then look at the duration of selected critical program phases, the ones that represent the final steps in the certification journey and are more likely to generate costly delays.

Finally, we compare the three OEMs program phases' duration as well as a best case flight test scenario to derive the risks to each OEM's schedule. The identified risks allow us to refine the probability of making the EIS date that can be found on the AAM Reality Index Entry Into Service infographic.

This analysis considers only the timeline of the vehicle certification/EIS and does not examine the additional crucial ecosystem elements - for example, infrastructure availability or public acceptance - that could further delay the start of services.

A final note: we have decided to adopt an unusual landscape format for this research note to provide the necessary real estate to make the many timelines contained within the following pages easier to read.

ARCHER - MILESTONES

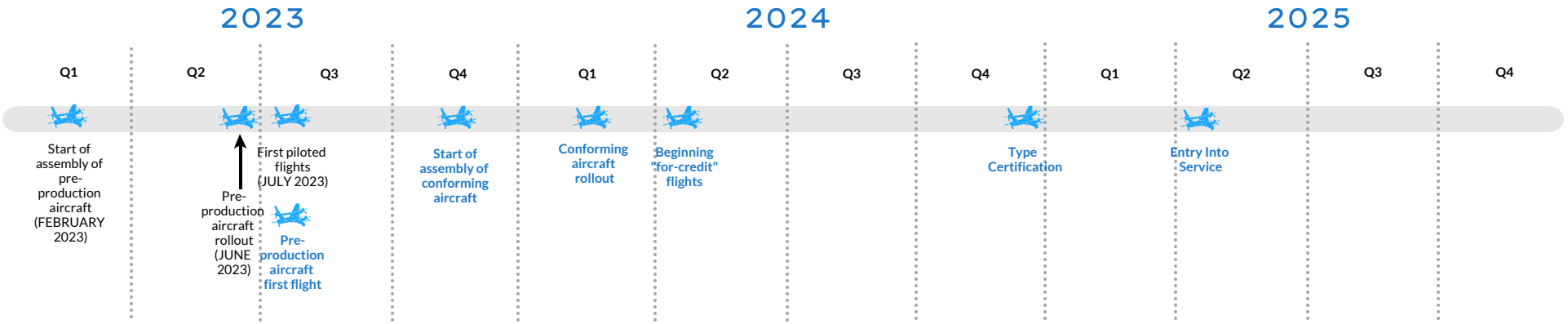


Archer's milestones for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text)

Milestone	Timing (LATEST)	Timing (ORIGINAL)	SMG Consulting assumptions and projections
Midnight demonstrator rollout	May 2023	Q2 2023	-
Midnight demonstrator first flight	October 2023	Mid 2023	-
Start of assembly of conforming Midnight	Early 2024	-	-
Conforming Midnight rollout	-	Q4 2023	OEM indicated the assembly completion in the ORIGINAL timing
First piloted flights	Mid 2024	Early 2024	Placed first piloted flight earlier than mid-year to be able to fit the start of "for credit" flight testing in the first half of 2024
Beginning "for credit" flights	First half 2024	2023	Placed following first piloted flights
Type Certification	Late 2024	2024	Pushed the TC as late as possible within 2024
Entry into Service	2025	2025	Spaced EIS 3 months after TC month's end

Timing contains OEM announced/forecasted (ORIGINAL: first forecasted date; LATEST: last forecasted date or actual date) milestones, taken from their quarterly earnings communication, press releases and interviews
Archer does not plan to build any pre-production aircraft

JOBY AVIATION - MILESTONES

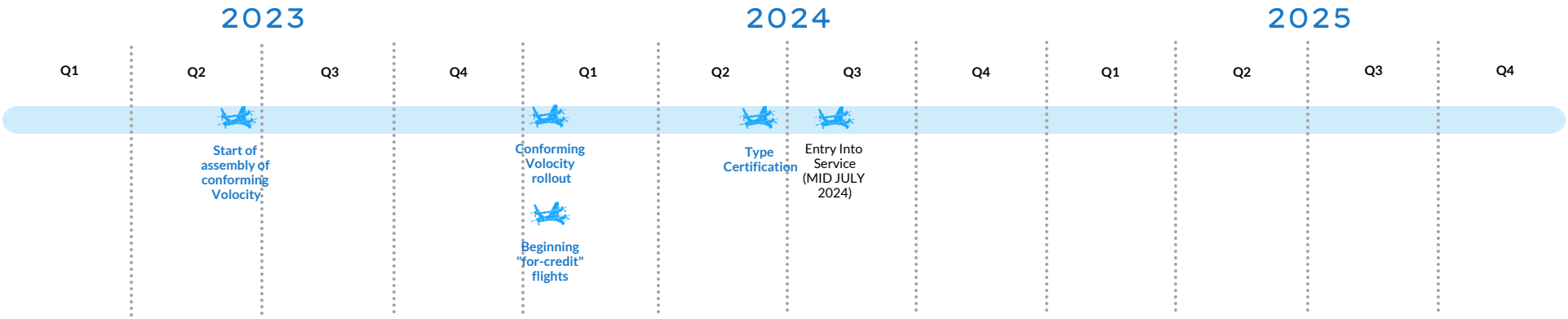


Joby Aviation schedule for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text)

Milestone	Timing (LATEST)	Timing (ORIGINAL)	SMG Consulting assumptions and projections
Start of assembly of pre-production aircraft	February 2023	Late 2022	-
Pre-production aircraft rollout	June 2023	First half of 2023	-
First piloted flights	July 2023	-	Announced in October 2023 but photographic evidence emerged in July 2023
Pre-production aircraft first flight	July 2023	First half of 2023	
Start of assembly of confirming aircraft	-	-	Assumed that aircraft #2 or #3 being assembled right now is conforming
Conforming aircraft rollout	-	-	Assumed that aircraft #2 or #3 being assembled right now is conforming
Beginning “for credit” flights	-	2023	
Type Certification	2024	2024	Pushed the TC as late as possible within 2024
Entry into Service	2025	2024	Spaced EIS 3 months after TC month’s end

Timing contains OEM announced/forecasted (ORIGINAL: first forecasted date; LATEST: last forecasted date or actual date) milestones, taken from their quarterly earnings communication, press releases and interviews
Demonstrators rollout and first flights pre-date 2023 (full scale flights started in 2017 with the Generation 1 demonstrator)

VOLOCOPTER - MILESTONES

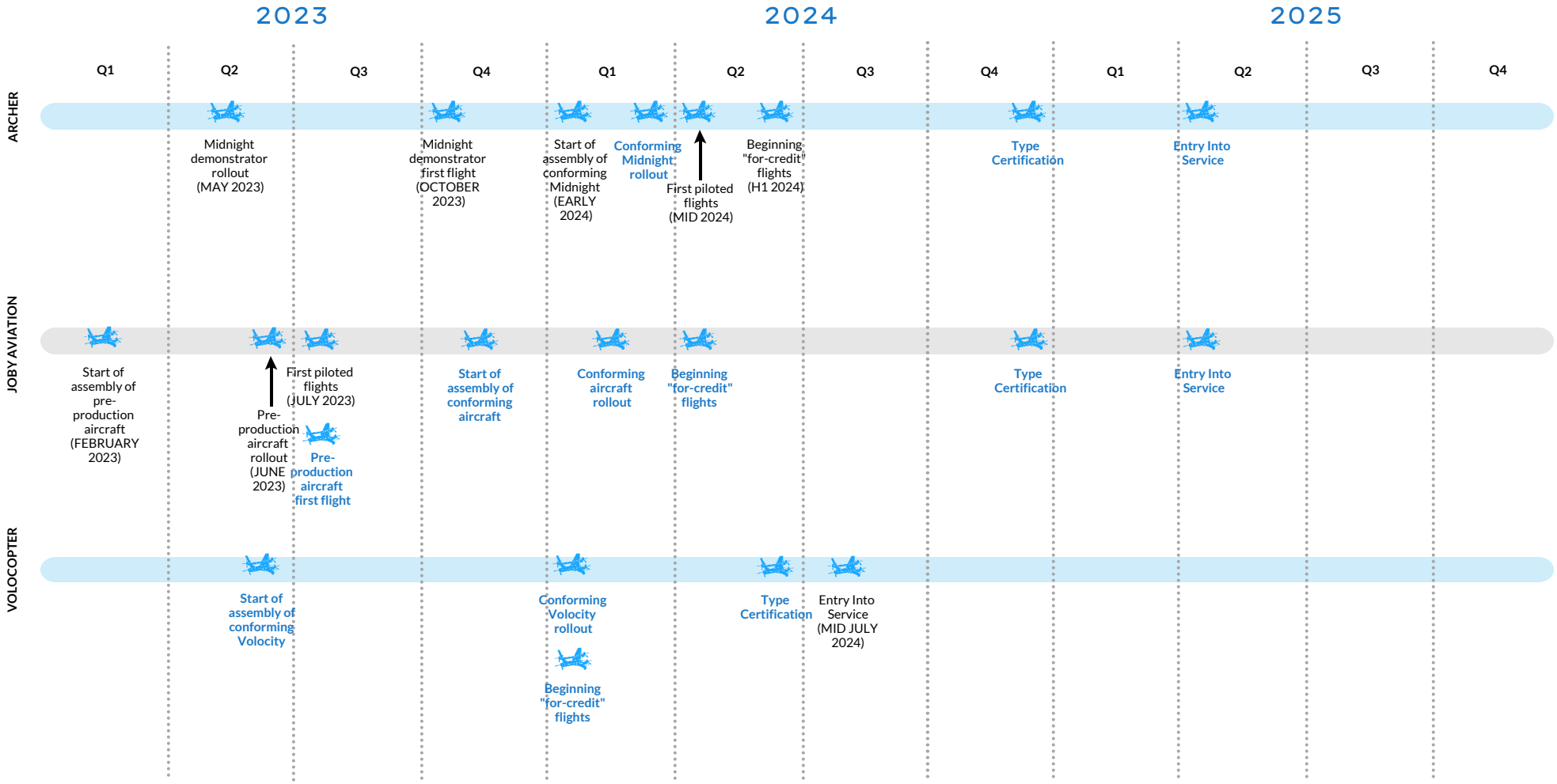


Volocopter VoloCity schedule for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text)

Milestone	Timing (LATEST)	Timing (ORIGINAL)	SMG Consulting assumptions and projections
Start of assembly of conforming VoloCity	-	April/May 2023	Original date aligned with the opening of the final assembly hall in Bruchsal
Conforming VoloCity rollout	-	-	-
Beginning “for credit” flights	-	July 2023	-
Type Certification	2024	Q2 2024	Pushed the TC as late as possible to allow services to start in time for the Olympics
Entry into Service	Mid July 2024	Early 2024	Paris Olympics: July 26 to August 11, 2024

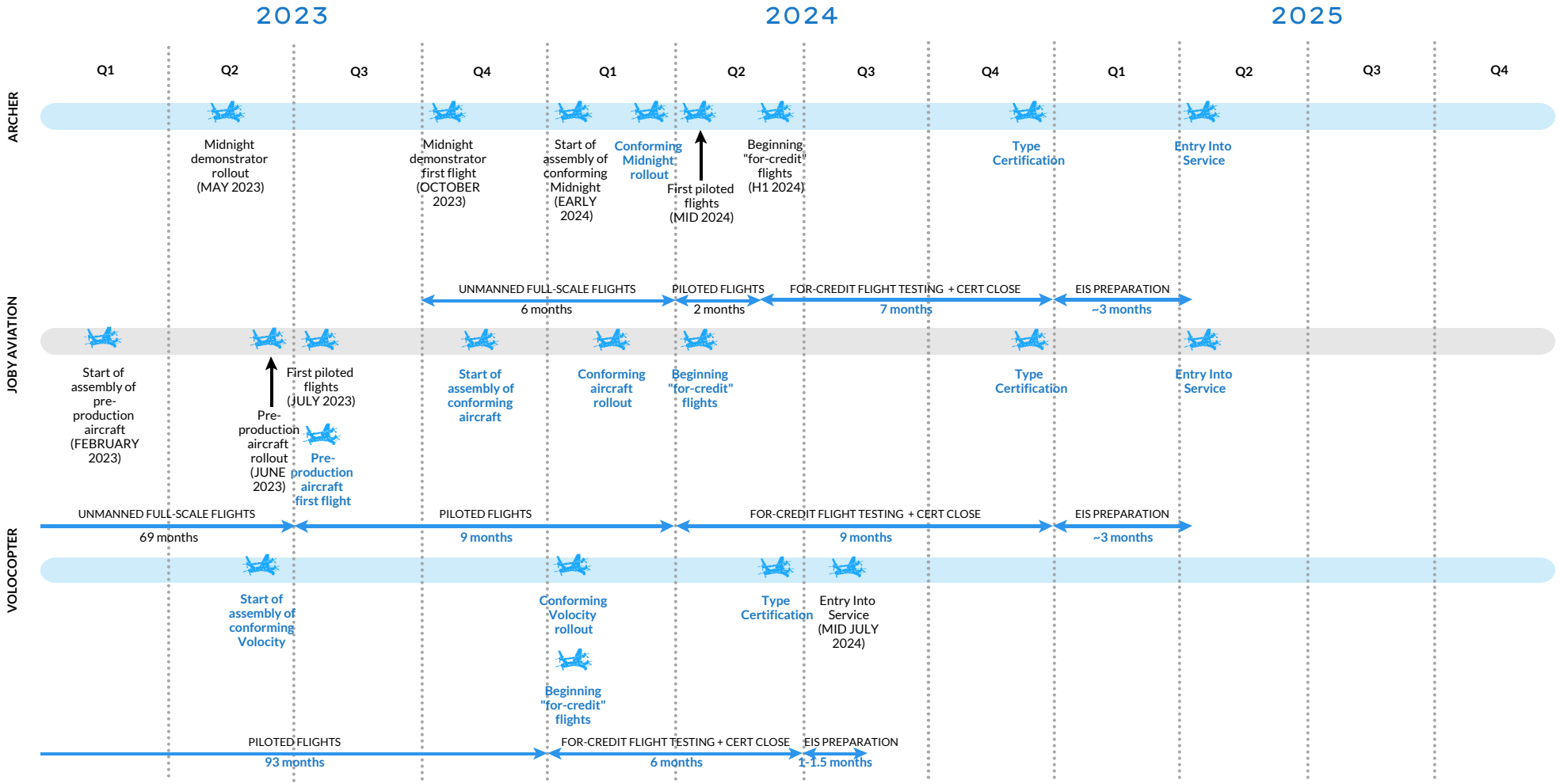
Timing contains OEM announced/forecasted (ORIGINAL: first forecasted date; LATEST: last forecasted date or actual date) milestones, taken from their quarterly earnings communication, press releases and interviews
Demonstrators and pre-production VoloCity rollout and first flights pre-date 2023 (piloted full scale flights started in 2016 with the VC200 demonstrator)

COMPARISON - OEM MILESTONES



Comparison between the milestones of Archer, Joby Aviation and Volocopter for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text)

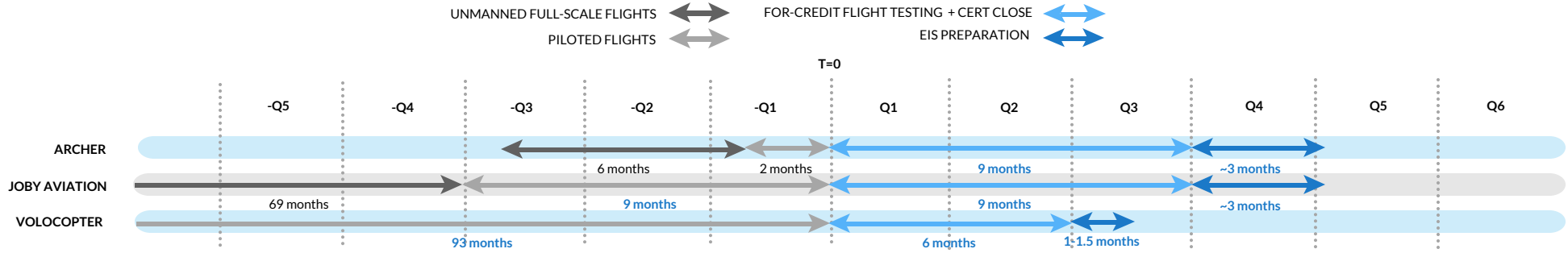
COMPARISON - OEM MILESTONES WITH PROGRAM PHASES DURATION



Comparison between the milestones of Archer, Joby Aviation and Volocopter for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text) with the addition of selected critical program phases' durations (in blue text durations between one or more SMG Consulting projections)

ANALYSIS - OEM PROGRAM PHASES DURATION

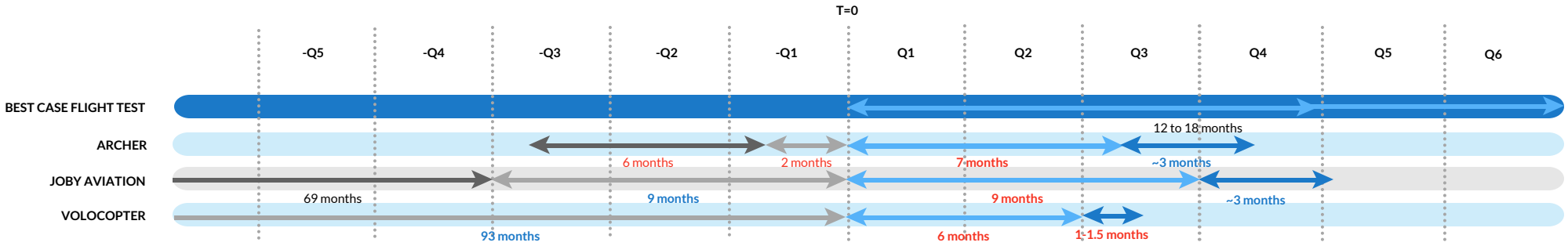
We take the program phases' durations identified on the previous page and we normalize them, choosing as T=0 the beginning of the "for-credit" flight tests. We then plot the duration of the four selected critical program phases - 1) Unmanned full-scale flights, 2) Piloted flights, 3) For-credit flight testing and certification close and 4) EIS preparation - for each OEM on a time axis that spans six quarters before T=0 and six quarters after T=0. The new graph below allows us to easily compare the different program phases' durations across the three OEMs.



In blue duration between milestones that include SMG Consulting's projections

Finally, we add the duration of the best case flight test, identified from historical "for-credit" flight testing data across aircraft programs in the last 20 years - the majority of the actual flight test programs far exceeds the best case we identified.

By comparing the duration of each OEM program phase with the others and with the best case flight test, we are able to identify risks due to the not sufficient duration of a program phase - highlighted in red in the graph below.

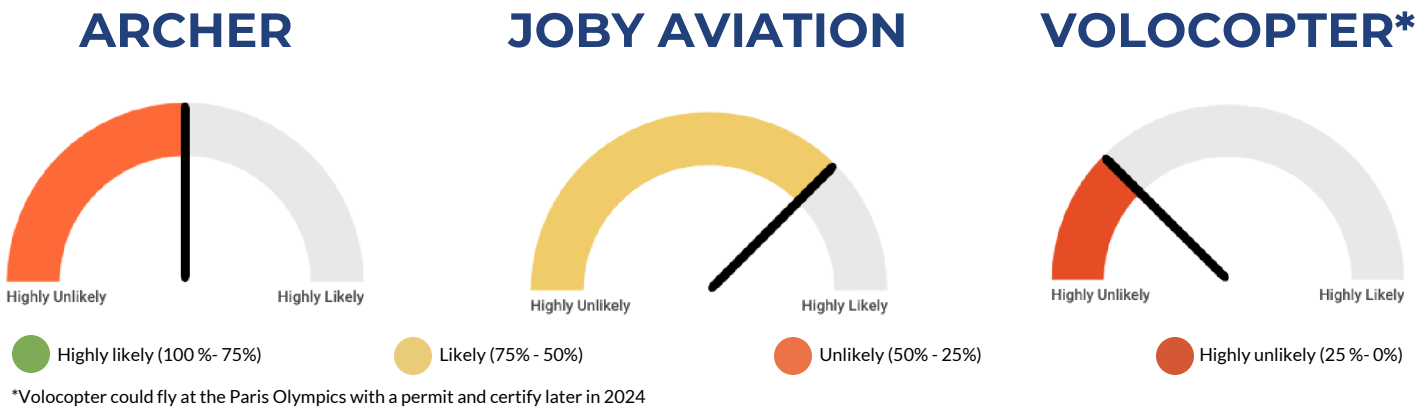


In blue duration between milestones that include SMG Consulting's projections
In red program phases considered at risk (bold text if the duration is between milestones that include SMG Consulting's projections)
EIS preparation for Archer and Joby Aviation is not considered a risk as we have included it in the schedule as an input with a reasonable minimum duration

Following are the risks by program phase we have identified for each OEM:

Program phase	ARCHER	JOBY AVIATION	VOLOCOPTER
Unmanned full-scale flights	Compressed schedule might not allow the OEM to learn how the full scale aircraft behaves throughout the entire flight envelope	-	-
Piloted flights	Extremely compressed schedule means extremely short flight time for the pilots before starting “for-credit” testing	Compressed schedule means short flight time for the pilots before starting “for-credit” testing	-
“For credit” flight testing and certification close	Extremely compressed schedule does not allow for any delays; such a short “for-credit” flight test has never been done before	Extremely compressed schedule does not allow for any delays; such a short “for-credit” flight test has never been done before	Extremely compressed schedule does not allow for any delays; such a short “for-credit” flight test has never been done before
EIS preparation	-	-	Extremely compressed schedule might not allow the OEM to perform all the necessary route proving flights

The analysis shows that every OEM EIS date carries a risk, with the total amount of risk proportional to the sum of the risk associated with each program phase.
While it is too early to definitively being able to say if the EIS date for each of the OEMs will be met, we can assign a detailed probability of making the EIS date using the same traffic light methodology we use for the AAM Reality Index Entry Into Service infographic.



*Volocopter could fly at the Paris Olympics with a permit and certify later in 2024

PREPARED BY:
SERGIO CECUTTA
PARTNER, AAM PRACTICE LEAD

SMG CONSULTING
AEROSPACE | DEFENCE | AUTOTECH

SERGIO CECUTTA

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