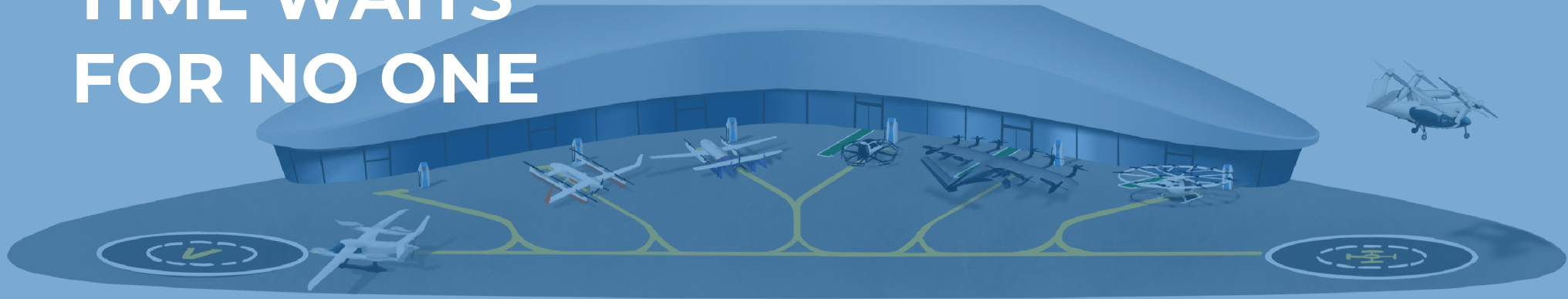


# TIME WAITS FOR NO ONE



Are 2024 and 2025 Entry Into Service dates feasible for the 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

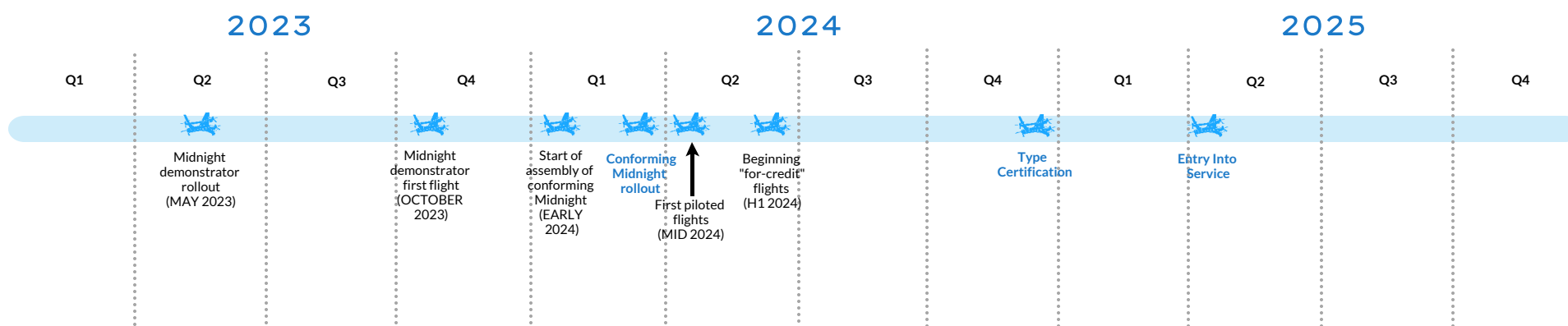
look at the duration of selected critical program phases, the ones that represent the final steps in the certification journey and are more likely to generate costly delays.

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

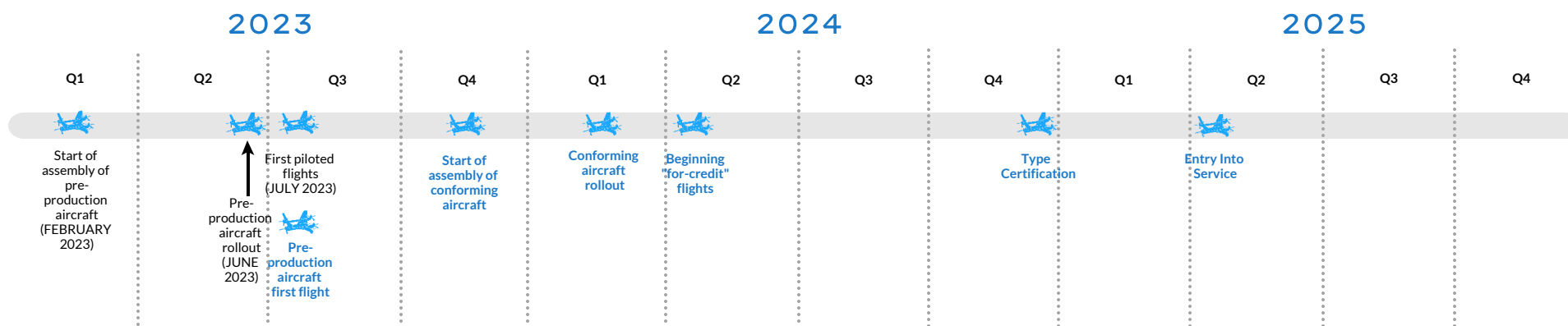


Archer's milestones for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text)

| 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

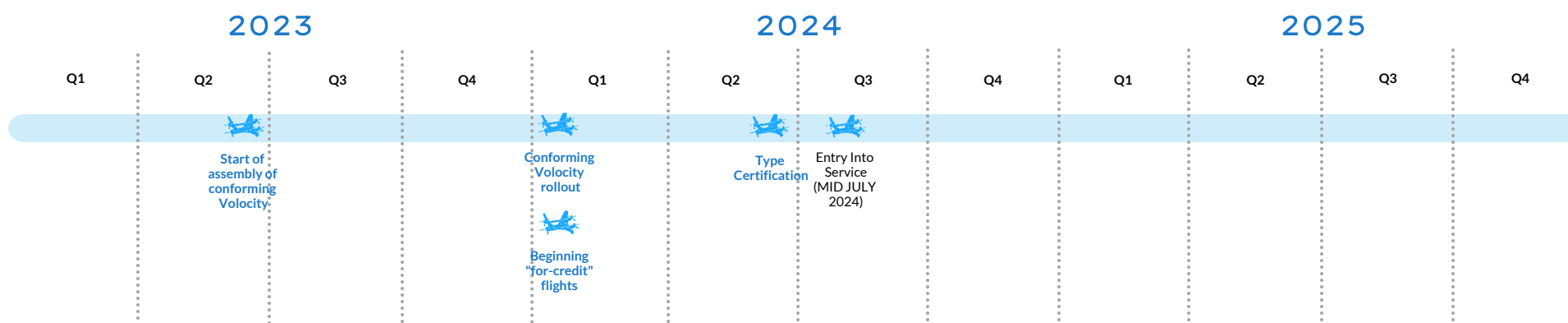


Joby Aviation schedule for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text)

| 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 conforming 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

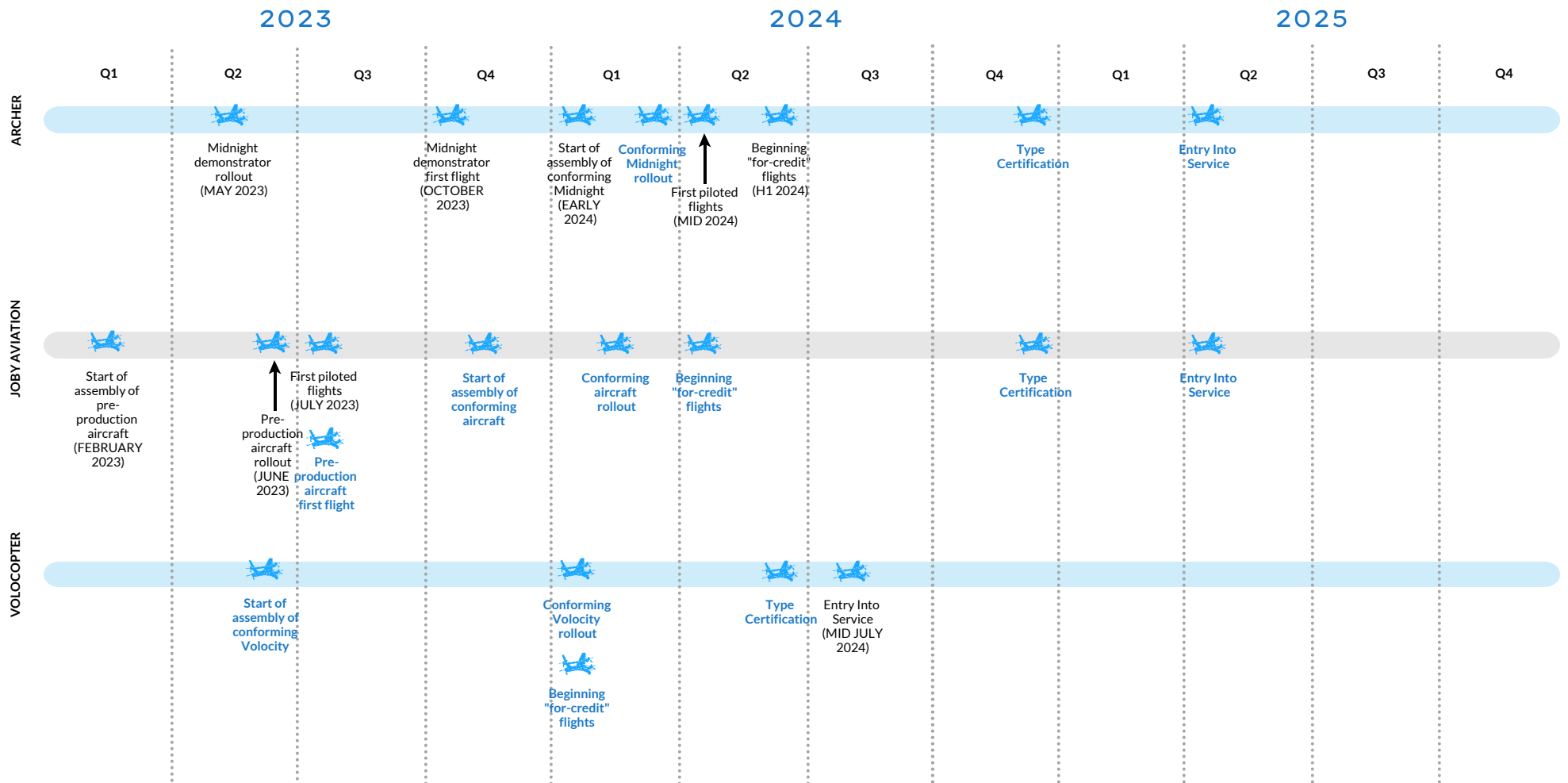


*Volocopter VoloCity schedule for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text)*

| 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  |

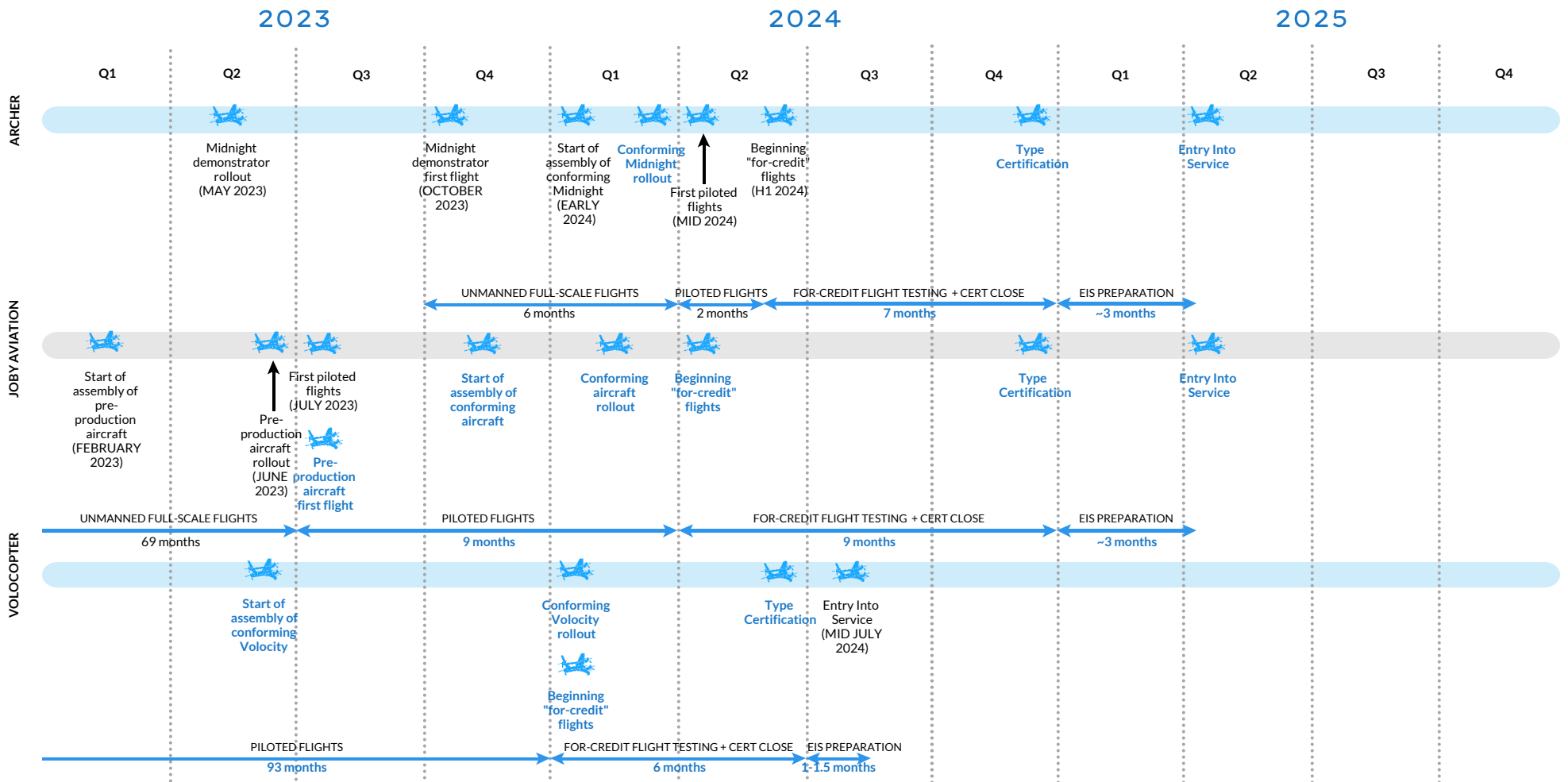
*Timing contains OEM announced/forecasted (ORIGINAL: first forecasted date; LATEST: last forecasted date or actual date) milestones, taken from their quarterly earnings communication, press releases and interviews Demonstrators and pre-production VoloCity rollout and first flights pre-date 2023 (piloted 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

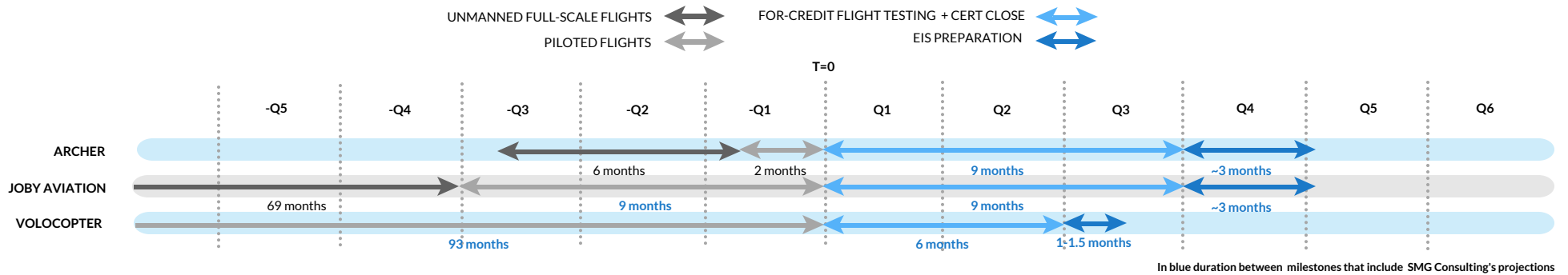


Comparison between the milestones of Archer, Joby Aviation and Volocopter for the 2023-2025 timeframe, built from OEM announced milestones (with the announced dates) and SMG Consulting projections (in blue text) with the addition of selected critical program phases' durations (in blue text durations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

# ANALYSIS - OEM PROGRAM PHASES DURATION

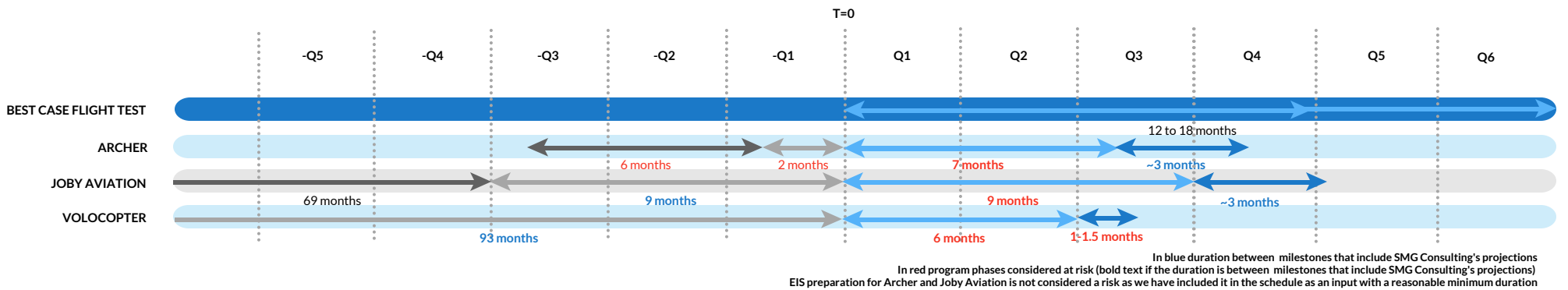
We take the program phases' durations identified on the previous page and we normalize them, choosing as T=0 the beginning of the "for-credit" flight tests. We then plot the duration of the four selected critical program phases - 1) Unmanned full-scale flights, 2) Piloted flights, 3) For-credit flight 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.



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.



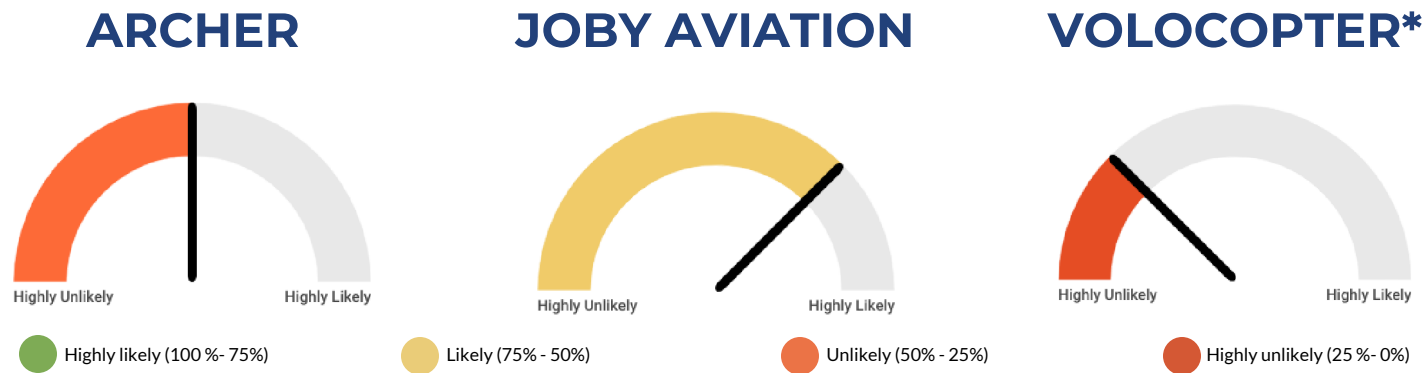
Following are the risks by program phase we have identified for each OEM:

| 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



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