Mobileye

Second Quarter 2023 Earnings Call

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Joshua Buchalter, *TD Cowen*

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Shreyas Patil, *Wolfe Research*

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PRESENTATION

Operator

Greetings and welcome to the Mobileye Second Quarter 2023 Earnings Call.

At this time all participants are in a listen-only mode. A brief question-and-answer session will follow the formal presentation. (Operator instructions).

As a reminder, this conference is being recorded.

It is now my pleasure to introduce your host, Dan Galves, Chief Communications Officer. Please, you may begin.

Dan Galves

Hello everyone and welcome to Mobileye's Second Quarter 2023 Earnings Conference Call for the period ending July 1, 2023.

Please note that today's discussion contains forward-looking statements based on the business environment as we currently see it. Such statements involve risks and uncertainties. Please refer to the accompanying press release which includes additional information on the specific factors that could cause actual results to differ materially.

Additionally, on this call we will refer to both GAAP and non-GAAP figures. A reconciliation of GAAP to non-GAAP financial measures is provided in our posted earnings release.

Joining us on the call today are Professor Amnon Shashua, Mobileye's CEO and President, and Moran Shemesh Rojansky, Mobileye's acting CFO.

Thanks, and now I'll turn the call over to Amnon.

Amnon Shashua

Hello everyone and thanks for joining our earnings call.

On the revenue side, the quarter was better than our expectations. Customers were very cautious in the first half of 2023, which led to below normal growth, but we have seen the production schedule solidify for the second half of the year where we expect to grow 16% year-over-year on much higher volume than the first half.

Profitability was better than expected with adjusted operating margin of 31%, up 4 points versus Q1. At the midpoint of our updated guidance, adjusted operating margin for 2023 is 29.5%, nearly 3 points higher than our original guidance back in January.

The good news on the cost side is a combination of macro factors, negotiations with customers on engineering reimbursement, and results of a continually refinement of our spending plans in order to heighten efficiency and optimize returns.

Importantly, despite the lower base of operating expenses in 2023, we still see OpEx growth rates in future years moderating to more normal levels compared to 2022 and the 30% growth we originally planned for in 2023. This should support good operating leverage over time.

Turning to business development for our advanced product portfolio, we continue to move more and more OEMs towards the design win phase. We can now count nine large established OEMs prospects in what we consider advanced stages for products like SuperVision and Chauffeur. In most cases we are not competing against anyone. The process is about physical testing to convince the OEM of the performance and the design domain of the system, establishing what role the OEM will have in customizing the system and also in negotiating the bundling of different products like SuperVision and Chauffeur across various brands, legal segment and launch date.

Beyond our history of execution and our ability to prove the capability and physical testing across long distances, multiple road types and conditions, what appeals to the OEMs is that our product portfolio is

scalable, cost efficient, engineering design efficient and, above all, displaying leading and cutting edge performance.

In terms of scalability, the core technologies of computer vision and extremely efficient EyeQ processing platform, boosted by REM mapping, forms the base line for solutions that are relevant across all vehicle price points and a wide range of feature sets from eyes on hands on, all the way to eyes off, hands off and driver off.

Our work with Volkswagen Group is a good example. Since 2018, all new vehicles across the group have used Mobileye provided ADAS and this relationship exists well into the 2030s. Beginning in 2021, REM mapping functionality was added to MEB platform, leading to a relatively low-cost way to provide class-leading lane centering capability among many other functions, and providing an early opportunity for the OEM to generate recurring subscription revenue. The success of this product, which we call Cloud-Enhanced ADAS, led to a recent design win to cascade REM across most of the entire group over time.

Next we have the SuperVision design win with Porsche. Porsche shares common platforms with other premium brands of the Volkswagen Group. While not formalized yet, we expect SuperVision to be adopted by the other premium brands to increase economies of scale. In fact, Audi and Bentley executives are already on record expressing excitement to bring SuperVision to their products. An additional benefit of SuperVision to our REM customers is that it creates a bridge to our consumer level eyes off solution called Chauffeur. The surround computer vision, REM and EyeQ based domain controller and SuperVision is also the baseline for Chauffeur. The difference in the systems is the addition of a secondary perception system made up of radar and lidar which results in significant increase in the mean time between failure which is obviously key to enabling eyes-off…in other words, full driver disengagement under a broad set of conditions and road types.

This also forms the baseline for our Mobileye Drive mobility as a service solution. On this front there has been recent news on our delivery of multiple self-driving systems which have been integrated into Volkwagen's ID.Buzz for testing by Volkswagen Commercial Vehicles in both the U.S. and Europe. The fact that Volkswagen has recently demonstrated these vehicles with analysts and media after only several months of us working together is a testament to how evolved this technology already is.

The ability to provide efficient and high-probability products across all vehicle price points, for both consumer-owned and mobility-as-a-service solutions, all based on the same proven core technology, is a huge selling point to OEM's.

As is the increased flexibility of our technology. We provide tools to OEM's to both tune the system and also to develop and deploy their own software in order to differentiate and to enable true ownership of their systems. For example, with the Porsche SuperVision program, our software team is providing about 600 tune-able parameters that Porsche engineers can adjust to create a unique customer experience. As an enabler for tuning, we have designed a formal high-level tuning language which we call "Driving Policy Shaping" that allows one to describe the desired driving policy as if one writes code on top of our driving policy "operating system". Then we have EyeQ Kit on top of that to offer them bespoke software integration within the Mobileye stack. As well as the potential to deploy non-Mobileye functions, such as automated parking or driver-monitoring, on the EyeQ, saving the cost of additional ECUs.

Final topic before turning it over to Moran is the continued rollout of the software to Zeekr vehicles on the road. As you all know, the full SuperVision capability is being delivered to Zeekr vehicles over time through over-the-air updates. Mapping is key to this. The complexities of mapping in China means that data collection must be done through Chinese partners and as a result data collections path is much later in China than North America and Europe. The map coverage in China is behind those other regions but it's quickly building. All Zeekr vehicles have had a very sophisticated highway assistance system for many months now, but until recently the full point-to-point navigate on pilot functionality was only available to a fairly small number of beta users.

We are very pleased that Zeekr recently significantly broadened the number of users with highway navigate-on-pilot, and we expect the full rollout to all users within weeks. Initial feedback has been very good. Zeekr's system is performing much better than other MLP systems in terms of ability to complete maneuvers without takeover in many difficult situations like construction areas, highway merges in heavy traffic, and performing lane changes within tight curves. Influencers and media have also highlighted the strength of the system versus competitors, focusing on the assertive human-like performance of the car, several calling it the most efficient and capable navigate-on-pilot they ever experienced. Any negative feedback has been around some dead spots in the map which will be rapidly built out over the following months.

The eyes-on hands-free market is much more developed in China than other regions, and it's a significant proof point to other OEM customers that Zeekr's system is outperforming. This supports the feedback we have gotten from other OEMs that have performed benchmark tests of their own in a test environment that proof points from actual production vehicles driven by non-engineers is obviously much more powerful.

I now turn it over to Moran to go over the financial results and dive into more detail.

Moran Shemesh Rojansky

Thank you Amnon, and thanks for joining the call everyone.

Before I begin, please be aware that all my comments on profitability will refer to non-GAAP measurements. The primary exclusion of Mobileye non-GAAP numbers is amortization of intangible items which is mainly related to Intel's acquisition of Mobileye in 2017. We also exclude stock-based compensation.

Starting with Q2, overall revenue was down about 1% year-over-year with core EyeQ revenue also down 1% year-over-year and higher ASPs did not fully offset a modest volume decline. We do believe that destocking of inventory at our Tier 1 customers impacted the growth rate in both Q1 and more sharply in Q2.

Looking ahead to the second half, our guidance implies that we will be back to meaningfully outperforming industry production volumes. SuperVision shipments were 10,000 units in the quarter. This was exactly as expected. As we noted, on the April earnings call, Q1 shipments of 25,000 were significantly higher than end market volumes. The intent in Q2 was to fully reduce that inventory build from Q1. The strong recovery in Zeekr end market volume and our intentionally low shipments accomplished this goal.

Gross margins were in line with our expectations. On a sequential basis, EyeQ margin was stable. The approximate 1 point increase in Q2 as compared to Q1 was simply due to SuperVision revenue being a smaller mix of overall revenue.

Operating expenses were lower than we expected and this led to strong adjusted operating margin of 31%, up about 4 points versus Q1. The following three areas accounted for the majority of the lower-than-expected costs in the quarter are:

Number one, on the payroll side depreciation of the Israeli Scheckel led to payroll savings in U.S. dollar terms. The FX rate was approximately 4% favorable to what we had forecast for the quarter.

Number two, the move into our new Jerusalem campus was delayed from May until the fall of 2023. The higher facility expenses from the new campus will now begin later in the year than we expected.

Number 3: We also experienced lower costs for our efforts around Mobility as a Service. We are constantly reviewing our activities to ensure that our product roll-out is as efficient as possible. In the case of MaaS, we have de-emphasized plans to certify an EyeQ5-based, NIO-based fleet of vehicles for our customers in the near-term. The costs simply weren't justified relative to the volumes that were possible on the NIO-

based platform. The benefits of the NIO-based fleet, however, still exist in terms of continued testing and validation of the software.

In terms of scaling production volume on the Mobileye Drive self-driving system, our go-to-market strategy is focused on integration of the system into purpose-built vehicles from vehicle builders including Schaeffler, HOLON and Volkswagen Commercial Vehicles. We expect these vehicle platforms to begin serial production in 2025, which also coincides with volume production of our EyeQ6 based compute platform and our software defined imaging radar, each important for scaling the mobility-as-a-service business.

In terms of cash flow, we continue to rebuild our strategic inventory of EyeQ chips which have been largely consumed over the course of 2021 and 2022 during the supply chain crisis. Our ability to satisfy demand during recent years, partially by consuming our inventory buffer, was a big positive. Rebuilding of the inventory is a very important activity so that we will be prepared in case of any potential disruption in the future.

Capital expenditures in the quarter were consistent with our view that CapEx should be roughly similar this year versus 2022.

Turning to the guidance, revenue is tracking in line with our prior guidance, which we are reaffirming today, both for the core EyeQ business and SuperVision. On EyeQ, schedules have become more solid over the last couple of months and customer requests to move volume around have largely ceased. Customer orders support a steep ramp over expected volume in the second half with Q3 up over 10% versus Q2 and Q4 up more than 20% versus Q3 levels.

On SuperVision, Zeekr end market volumes recovered strongly in Q2, with both reduced the inventory build in Q1 and solidified the volume trajectory for the second half. We continue to expect full-year shipment consistent with our prior guidance. Q4 will be higher than Q3 given the new vehicle launches and the Zeekr 001 entry into Europe.

Gross margin for individual product lines are stable. We expect SuperVision revenue mix to be higher in Q3 and Q4 versus Q2, which will drive some reduction in overall gross margin versus Q2 levels.

On the adjusted operating income side, the positive updates to our guidance is related to lower-than-expected operating expenses. Year-over-year growth of OpEx is now expected to be around 22% to 23% versus our prior indication of 30% growth. Nearly half of the reduction already occurred in Q2. The rest of the reduction is primarily coming from the following two areas:

Number one, to a varying degree the areas of lower costs in Q2 like payroll, facilities and mobility-as-a-service are generating some savings in the second half of the year as well.

Number two, non-recurring engineering reimbursements in the second half of the year are now expected to be higher than we had originally forecasted.

In terms of tax rate, we continue to expect an effective tax rate in between the 12% and 13% range for the year.

Before we start the Q&A session, I'd like to thank Anat Heller for being an amazing mentor to me and for her continued support as an advisor to the Finance team and management. I'd also like to thank our entire Finance team for their professional and tireless work since we've become a public company.

Thank you and we will now take your questions.

Dan Galves

Priscilla, we're ready to start the Q&A session.

Operator

Thank you. Our first question comes from Aaron Rakers from Wells Fargo.

Aaron Rakers

Thank you for taking the questions. I do have one question and one quick follow-up. I think in the prepared remarks you had started with a comment that you now have nine large—estimated OEMs engaged in terms of Chauffeur and SuperVision. I think last quarter you talked about having six large OEMs kind of deployed, looking out in the 2024 timeframe. So, I'm just curious if you can walk us through how—is that a change? How things have changed in terms of your pipeline of design wins on SuperVision?

Amnon Shashua

Thank you. I'll take this question. We noted in the press release that our serious engagements on SuperVision and Chauffeur have expanded versus the beginning of the year in terms of the number of OEMs. I'm defining serious engagement as where OEM engineers are fully aligned with Mobileye, that Mobileye is the right path forward in terms of technology, performance and cost, where we already are in production, executing an official product program or in a funded physical concept phase.

Currently, this list of OEMs represents about 30% of global volume. This is very encouraging because the vast majority of the rest of the industry remains very open to us. So, for these OEM engagements we are not competing with another company or technology.

But there are other complexities in the decision making process that have nothing to do with competitive landscape. Things like go-to-market and consumer pricing strategies, how to best align the product into the portfolio launch plan, defining roles within the program, what to do with internal development assets. So, with Level 2+, what we call eyes on hand off, and the path to eyes off as well, this is a new, potentially gigantic automotive TAM with strategic implications and complexities that make the decision making process more complex than a simple ADAS program.

Working in our favor is an increase in competitive pressure as Tesla and the China startups including Zeekr push the envelope on hands-free technology. We have noted an increase in seriousness within the OEMs over the past one or two years, and have seen some OEMs that appeared to be far away from us on advanced technology move rapidly to align behind our approach. This is all very positive for us as a technology and cost leader.

We still see high likelihood of significant design wins announcements in the second half.

Aaron Rakers

That's very helpful and very interesting.

Then I guess on the other front, I'm just curious as we think about Zeekr 001, 009, you've got Polestar 4 . I guess it sounds like the inventory dynamic and the issues at Zeekr kind of normalized themself out. As we look forward, I guess I'm trying to understand what are you embedding as far as the Zeekr volumes for the full year, reiterating the full year guide? What I'm trying to gauge is how do we think about the potential upside if these volumes continue to improve? Just updated views on Zeekr and what you've seen as a set up into the back half of the year?

Amnon Shashua

I think 2023 is very solid in terms of our corrected guidance that we did last quarter. Regarding 2024, we provided a long-term outlook for SuperVision volumes at CES in early January and we'll make annual updates, but we're not going to update this on an ad hoc basis.

But in order to provide some more color, everything is on track with new SuperVision customers that we talked about in January. We closed the Porsche design win and the expansion with SuperVision platform to other Volkswagen Group brands, and that's proceeding as planned.

The pipeline of OEMs in advanced discussions with SuperVision has grown versus where it was in January. And in terms of 2024, the number of vehicle models with SuperVision systems, that has not changed. We expect to have five vehicles in production by Q1 of 2024 compared to one at the beginning of this year. Two of those vehicles are sold outside of China.

The one thing that has changed is that our 300K unit outlook for next year assumed that Zeekr 001 would sustain its Q4 2022 demand pace in China. That was the best data point available in January. The pace in Q2 of this year for that specific vehicle was about 60,000 units lower than the Q4 2022 pace on an annualized basis. So that's consistent with what we assumed in our guidance update last quarter, but that gap is a risk to the 2024 forecast we provided in January.

Now, I will point out there has already been a significant adjustment in expectations from about half of our covering analysts who are projecting volume in the 220K range for 2024.

Aaron Rakers

Thank you very much.

Amnon Shashua

Thank you.

Operator

Our next question comes from Chris McNally with Evercore. Please go ahead.

Chris McNally

Hey team, two roadmap questions if I may. First on the SuperVision rollout—Amnon, I appreciate the '24 update. I think that's been clear. My question is really around maybe as we think about '25 and it's more not asking about a target but more are you starting to get the visibility on some of these larger, more consequential programs on whether they could launch in '25 or '26, or is it just too early at this point and the OEMs themselves are still trying to determine launch timing mode? When is that sort of typical go/no-go where you would sort of have an idea whether '25 programs would be significant?

Amnon Shashua

We are probably more confident in the 2026 forecast than 2024. The business will be much more diverse in 2026 with Porsche and likely several other automakers being added, as well as significant volume outside China with Zeekr and other Geely related brands like Polestar. This will reduce reliance on just a few vehicles and one region, like we have now, and it would lead to less fluctuation in volumes.

Now, on the high probability potential wins that we included in our 2026 forecasts, that still look very good in terms of booking design wins and launching over the course of 2025 and early 2026. But we feel very confident in the overall trajectory of the SuperVision business, business line in terms of big inflection point in volumes around the 2026 timeframe.

We also see the potential for SuperVision platform to spread to more models within OEM customers as automakers get more bullish on the potential profit-making opportunities. Now, this could positively impact our mid-term projections.

So, I think we are very confident on 2026. Things look brighter than they looked back in January.

Chris McNally

Okay. That's great. The quick follow-up, always sort of a delicate one, but regarding the more aggressive talk of full self-driving licensing over the last six months, Amnon, maybe just even very generally you could talk about the recent tone of your customer conversations with respect to full self-driving specifically, either good or bad. I mean it could honestly make some OEMs move faster to compete with their offering, or maybe some OEM discussions could slow down if they just want to take a free look and engage Tesla.

It's just such a relevant topic. Anything that you can add on that tone, if it's had any effect on the conversations that you're having directly.

Amnon Shashua

I think that Tesla has mentioned several times in the past about licensing their FSD, so it's not really a new concept. It's not new to have competitive noise in the market. I would say that we have lots of respect to what Tesla has accomplished with FSD. In fact, we see their rapid development as a significant positive for us as it pushes the market to move faster to implement advanced solutions like SuperVision.

Now, specific question of Tesla working with OEMs, I think there is one argument that really clarifies the matter. I would put it as performance versus cost of the system.

If you look at SuperVision, it's an FSD-like category: 11 cameras and the radar, a few radars. SuperVision is also REM, the high-definition mapping in addition to what FSD can offer. Today we have 120,000 SuperVision enabled vehicles in China, more than 1,000 beta testers and the response in terms comparative analysis is very, very good. It's on par or superior to FSD. That's measured by the rate of intervention and ability to handle complex maneuvers. REM is a strong differentiation.

But now, let's look at the cost. The price of a SuperVision sub system including the cameras and radars, the ECU, software with REM is approximately somewhere in the $2,500 range. Now, if Tesla matches that system price then OEMs will be able to offer SuperVision or FSD at less than half the price that FSD is offered to Tesla car owners. This would immediately cannibalize Tesla whose strategy appears to be to reduce gross margins on the vehicle and rely almost solidly on the value of the FSD for creating growth.

I would also mention—and this bodes well with our OEM customers. There are 400,000 FSDs on the road since 2019 and Mobileye has already 120,000, and in approximately two years we'll surpass the 1 million bar and from there we'll grow much faster.

There are also important differences with respect to access of data, something that Tesla has over often highlighted as an advantage. That's another key advantage that OEMs recognize. For example, at their March Investor Day, Tesla noted they had a video cache of 30 petabytes, and were intending to grow to 200 petabytes. Our video database is 400 petabytes. Not to mention all the data that we collect for REM, the high-definition mapping. We collected almost 9 billion miles of this type of data in 2022 alone. Tesla talks about 300 million miles of driven to date.

So, I think overall when you look at what Tesla has accomplished, it's a very, very big positive for us. We believe that SuperVision is a much more optimal solution for our customers, both in terms of cost and

performance and customization basis, and all of Tesla, the accomplishments actually create a very positive momentum to have other OEMs wanting to have this type of—this category of solution in their own cars.

Chris McNally

Appreciate the detail.

Dan Galves

Thanks Chris.

Operator

Our next question comes from Joshua Buchalter with TD Cowen. Please go ahead.

Joshua Buchalter

Hi team. Thanks for taking my question and congrats on the results. Appreciate the color that you gave on how you're thinking about SuperVision in 2024 in particular on the lowered 001 production numbers. I was curious compared to the original expectations how you're thinking about the other four that should be meaningfully in the '24 numbers. Has there been any more, I guess, incremental handicapping to how you're thinking about those vehicles given those are new vehicles that haven't really launched yet with the new technology, or are your expectations for those similar to what they were six to nine months ago? Thank you.

Dan Galves

Thanks, Josh. It's Dan. I'll take this one.

We feel good about the other models, right? The Zeekr 009, for example, is performing exactly to the expectations that Zeekr provided to us and that we baked into the forecast. There's another vehicle launching right now and then Polestar4 looks to be on track to launch. So yes, we're feeling good about the expectations, and in 2023 as well. Like, relative to the revisions that we made last quarter, the Zeekr 001, the Zeekr 009 are performing exactly as we expected. And with some minimal volumes from the additional launches in the back half we should be able to comfortably get into our guidance for that product.

We feel good about kind of how the performance is going in 2023 and everything looks solid for 2024, except for that gap that we identified versus where we originally expected back in January.

Joshua Buchalter

Got it. Thanks Dan. Congrats on the VW win for the more fully autonomous vehicle. I was hoping you could help us understand any guard rails you can give on timing and scope of this project. When should we expect this to contribute to initial EV revenues? Is this plan for—the press release had read like commercial vehicles, but is this planned and do you see a roadmap for this Chauffeur type technology moving into more consumer types of vehicles? Thank you.

Amnon Shashua

The only reason that we mentioned the ID.Buzz is because Volkswagen in their own PR they mentioned the Austin—vehicles they shipped to Austin with our technology for test, and also in Germany.

It's still ongoing, all the formalities of actual design win for this, but they are already more than 30 vehicles already in testing phase at VW, and hopefully this will mature into an official design win, hopefully this year.

Joshua Buchalter

Thank you.

Operator

Our next question comes from Mark Delaney with Goldman Sachs. Please go ahead.

Mark Delaney

Yes, thank you I was hoping for some updated and added details on your EV plan with Mobileye Drive. I believe if I heard correctly you're now putting less emphasis on outfitting Neo vehicles and you mentioned it making more sense to ramp EVs on purpose-built vehicles in the 2025 timeframe, so I was hoping for a bit more color on what's changed and led you to have that new strategy, and what your confidence is in having those purpose-built vehicles ready in the 2025 timeframe.

Amnon Shashua

I'll take that. Back at CES we mentioned that we are working with the platform builders. We mentioned Schaeffler. We mentioned Benteler with their daughter company HOLON, and we mentioned also a third company who by now they made their own press releases, which is Volkswagen Commercial Vehicles on the ID.Buzz. We are working also with another personal car marker called P3. I think we announced that a while ago with the Mobileye Drive. So the focus is on collaborating with or partnering with platform builders rather than having our own vehicle and homologating our own vehicle and then performing the entire chain of owning vehicles, operating vehicles, customer-facing applications. We do that through partnerships. So, that is the new focus that we announced back at CES.

Everything is on track, including what you saw in the press a few weeks ago by Volkswagen on actual testing of ID.Buzz is equipped with our technology.

Mark Delaney

Okay. That's helpful. Thanks.

I was hoping you could also share a little bit more of an update on the progress you're making developing your own radar and LiDAR sensors as I believe they could be helpful in supporting your opportunity with both the Schaeffler offering as well as Mobileye Drive. Thank you.

Amnon Shashua

The imaging radars we are on track for end of 2024 SoP . We are already been interacting and engaging with a Tier 1 partner to work together on offering the radar to the market. It's on track for end of 2024. The FMCW LiDAR is on track for second generation LiDARs around 2027/2028 timeframe where we feel that first generation autonomous vehicles would be served with final flight LiDARs and second generation with FMCW.

Dan Galves

Thank you, Mark.

We'll take the next question please, Priscilla.

Operator

Our next question comes from Shreyas Patil with Wolfe Research. Please go ahead.

Shreyas Patil

Hey, thanks so much for taking my question. Maybe just for thinking about how to think about the revenue or potential margin upside that you could see from Zeekr as they are now unlocking some of these more advanced features. Is that something that we would be seeing more into 2024 potentially, or could we see some of that even in the back half of this year?

Amnon Shashua

I think that potential we'll see in 2024 because the NOP feature powered by REM is for the first six months is going to be offered for free to all the Zeekr customers and then we'll start in revenue based on a certain traction, we will see revenue. So that should kick in in 2024. We're talking about hundreds of dollars per vehicle potential in 2024.

Shreyas Patil

Okay. Understood. Then I'm not sure if this is relative to feel free to dismiss if I'm off base on this. Does the current political situation in Israel have any implications for you from a business perspective?

Amnon Shashua

Well, it's creating distress. It's creating personal distress and I think also most of Mobileye, if not all of Mobileye employees are experiencing this kind of distress.

But when you look at the Mobileye employees are all professionals. We haven't seen any effect on efficiency and productivity in the past few months. We're not manufacturing anything in Israel. Israel is not a source of revenue for Mobileye so we don't see any material impact for the political upheaval that is going on in Israel.

Shreyas Patil

Okay. Then must maybe a quick modeling one. Just how to think about the benefit of the engineering reimbursements that you mentioned in the second half, and what's driving that increase? Is it from the Drive business or is it also from SuperVision or the base ADAS? Thanks.

Moran Shemesh Rojansky

Yes, so it is basically coming from base ADAS. We have in our programs, we have reimbursement at all for most of our programs and sometimes we cannot expect it to be so we might get additional benefit on these reimbursements, but it's mainly related to ADAS, ADAS reimbursement for this year, for 2023.

Dan Galves

Yes, and I think that there was one smaller item related to Mobileye Drive that we're expecting now as well.

Moran Shemesh Rojansky

Yes.

Shreyas Patil

Okay. Thanks.

Dan Galves

Thanks, Shreyas. Okay, we'll take the next question, please. Thank you, Shreyas.

Operator

Our next question comes from George Gianarikas with Canaccord Genuity. Please go ahead.

George Gianarikas

Hi everyone. Thanks for taking my question. You characterized a couple of times in the script about not seeing competition in many of the discussions you're having with OEMs. I'm wondering if you can just take a step back and help us understand your view of the competitive landscape, not relative to Tesla FSD but more to some of the other internal OEM efforts and some of the point solutions in the marketplace and how you see the market evolving over the next 12, 24, 36 months. Thank you.

Amnon Shashua

I think what we're talking about – the competitive landscape of the category of SuperVision and going upwards the competition comes from—the majority of the competition comes from in-house development of OEMs. We have seen in the past kind of year or so some form of awakening of OEMs that went through this process of building an in-house solution for a SuperVision-like type of product, or even trying to do an eyes-off product. They tend to be somewhere between four to six times more expensive than our solution, and performance-wise we don't see advantage.

They also come to the conclusion that it may satisfy a very, very slim piece of their business in terms of very high end models and keep a big gap in terms of the medium segment vehicles. This brings OEMs back to us to talk about SuperVision.

We have a large number of serious engagements with OEMs that in the past were very bullish on talking only about in-house development, and we are now around the table talking with them about SuperVision products and beyond, beyond SuperVision.

That's the majority of the competitive landscape. It's not the likes of NVIDIA and Qualcomm. They are offering the tools for in-house development of OEM, so the competitors are the OEMs themselves, and as I said before we see a certain wave of awakening from that attempt.

Dan Galves

Yes, and George, just to follow-up with one point, what we said specifically was that OEMs that represent about 30% of global volume, we're in these serious engagements where essentially these OEMs have aligned behind our approach and are telling us there's not—that we have no competition there.

The rest of the industry is still in this, so I want to make the comment that we don't have any competition. Like Amnon said, it's mostly coming from internal efforts, but with these 30% that was what the comment was really reflecting.

George Gianarikas

Thank you. Just as a follow-up, you talked about this awakening. Is there one particular element of what you bring to the table that's causing that? Is it the REM mapping, RSS? Is there anything that you can point to that's more important than the other component pieces? Thanks.

Amnon Shashua

I'll point you to kind of the competitive landscape in China, for example. You have XPeng, you have Li Auto, you have Nio – they have product on the road. We look at their product. They have many more sensors than SuperVision. All of them have front-facing LiDARs. Some of them have multiple front-facing LiDARs. They have much more compute, sometimes somewhere between 10 to 20 times more compute than we have. Very, very expensive, their products. When we start doing benchmarking, we are superior in terms of performance in almost every aspect. This gets exposed to other OEMs.

Once we started putting vehicles on the road with our technology where people can test, OEMs can test, now also the public can start testing, the difference is becoming visible. It's all about cost versus performance, right? Even if they have the same performance as the SuperVision, but they cost four times more, then it's not competitive. I think this is becoming visible now that things are really in production.

Dan Galves

I think that that's exactly right. It's that fact of being in production, being able to demo the systems over thousands of miles because the REM maps are now existing across U.S. and Europe, it's the actual cost of the system. Because it's in production, it's no longer a projected cost; it's really an actual cost. And then it's pressure from other automakers moving fast, like Tesla and some of the Chinese OEMs that Amnon has referred to as well. These are all kind of areas where we think it's driving this awakening.

George Gianarikas

Thank you.

Dan Galves

Next question please, Priscilla.

Operator

Our next question comes from Itay Michaeli with Citi. Please go ahead.

Itay Michaeli

Great. Thanks. Hi everybody. Just a first question going back to the engagements with the nine large automakers. One, can you talk about just the reception thus far in the EyeQ kit as well as the driving policy behavior model? And then secondly, roughly when do you expect these automakers to make their sourcing decisions? Is it partially this year/next year or maybe mostly this year?

Amnon Shashua

We believe that sourcing decisions will take a number of months. So, somewhere this year, beginning of next year, first quarter next year, this is kind of the timeframe that we are seeing.

In terms of working together, EyeQ kit and the behavior shaping language that we have built, as we move forward we are adding more and more capabilities for allowing OEMs to really have hands-on onto our system. We're gradually creating this as a platform. The behavior shaping language is really something very powerful. It allows the OEM to write actual codes, kind of XML files that describe in great details a lot of the aspects of the driving policy that they wish to have and it's all running on top of our driving policy.

You have a very powerful driving policy that when you test you are simply amazed how good it is, and now you can shape it to your own needs. It's like writing code on top of an operating system. You don't need to write the operating system in order to innovate and write code on top of it.

As we move forward, we are adding more and more innovation that allow OEMs to have serious hands-on on top of our platform, and this has a very, very good reception.

Itay Michaeli

That's very helpful. As a quick follow-up, I was hoping you could touch upon the second generation of the REM maps that you're developing, maybe launching, in terms of what that does to the journey from eyes--on to eyes-off and maybe when you expect that to roll out?

Amnon Shashua

REM maps is a continuous development. It's not that there is a first generation or second generation. Our focus now is expansion in China and also activating the REM maps in Europe and the U.S., but China is the first priority because this is where the production vehicles are now being deployed. We're adding more and more automations to the REM maps. This is necessary in China because to comply with the Chinese regulations, a foreign entity cannot even view the data so it makes us more efficient and much, much better in order to comply with those regulations. So, this our first priority and as we move forward with the Porsche program and additional programs that will come in '25, '26. Also Polestar are coming outside of China later in 2024, the priority will start shifting. With Europe and U.S. to make the REM maps there in a product for deployment.

Itay Michaeli

That's very helpful. Thank you.

Operator

Our next question comes from Ananda Baruah with Loop Capital Markets. Please go ahead.

Ananda Baruah

Hi guys. Appreciate you taking the questions. Two quick ones. Is there any way to provide context about how we should space the interplay between the mix that you talked about, heading into 2024 and various OpEx dynamics. You mentioned some cost saving, you also mentioned some costs coming on. How those things play together, the gross margin OpEx dynamic as we head into 2024. Then I have a quick follow-up after that. Thanks.

Amnon Shashua

I'll pass the cost saving and all of that to our acting CFO.

Moran Shemesh Rojansky

As for the OpEx growth, what we've said in the past, 2022 and 2023 will higher than our historical levels. In terms of percentage rolled out of operating expenses. We believe that in 2024 we'll be returning to our historical level of between 15% and 20%. Twenty-twenty two was almost 35% growth and our original expectation for 2023 was around 30%. Despite the good news on 2023 OpEx, we still believe that 2024 will be close to 20% than 30%. So the OpEx growth would be the fact that we are—the base is decreasing, we're still not going to increase the expectation for 2024.

Ananda Baruah

Very helpful. The quick follow-up is, you had actually mentioned, I believe, this might be more of a clarification that OEM inventory, destocking has had some impact in demand. You had talked about a time frame from which it will normalize. Can you just clarify the time frame that you expect that to normalize. That's it for me. Thanks.

Dan Galves

You're talking about SuperVision inventory or EyeQ?

Ananda Baruah

Yes, the EyeQ.

Dan Galves

You're talking about the again. Got it. Okay. Sorry.

Moran Shemesh Rojansky

Yes. Actually we've seen that the second quarter and also the first quarter, the fluctuation between the quarters was pretty big and we see the second half is much more robust than the first half. We think it's a result of our customers coming to the beginning of the year. We've had our levels of inventory, maybe resulting from price increases at the beginning of 2023. Now we see schedules stabilizing in terms of EyeQ. For the beginning of the year we had requests for ships of volumes from Q2 to Q3 or Q3 to Q4. We are no longer seeing that, so it's pretty stabilized. We think that the last two years have been very bumpy in terms of supply chain crisis and production volumes, but of course it's not the same situation as we entered this year and that's why we see the volume increase and inventory issue, we think played a role more in the first half of the year.

Amnon Shashua

I think I'll add a bit. In terms of—there are two types of inventory. Inventory that our customers have piled up, in terms of EyeQs and that as Moran said, it has stabilized. We don't see any request to push volumes from quarte- to-quarter. Then there is our own inventory that we build six months ahead of EyeQ chips just to make sure that if another crisis knocks on our door, we'll be prepared, and that inventory has been completed and that affected kind of comp because we had to buy more EyeQ chips than we normally have in order to protect our inventory. That I think we have completed or it's going to be completed till the end of the year.

Moran Shemesh Rojansky

Yes, it's at the end of the year.

Ananda Baruah

It's all very helpful. Thank you so much. Very helpful.

Amon Shashua

Thanks Ananda

Operator

Our next question comes from Dan Levy with Barclays. Please go ahead.

Dan Levy

Hi. Good afternoon to you. Thank you for taking the questions. First, a clarification on some of the volume commentary that you received as far as it relates to sequential improvements. Maybe you could just clarify again, just with the cadence of volume should be over the next couple of quarters as far as it relates to SuperVision. Thank you.

Dan Galves

Thanks Dan. Just to clarify what we said in the prepared remarks. We were referring to EyeQ volumes being up more than 10% versus Q2 levels and then Q4 levels being more than 25% above Q3. We should also see some average selling price increases because of SuperVision becoming a bigger part of the mix and that was really not part of the comment about the volumes. Just really wanted to kind of support that volume expectations. Volume orders from our customers have been very solid and point to much higher volumes in the second half of the year.

Dan Levy

Great. Thank you. Then wonder if could just follow-up on the conversation, specifically on Chauffeur. It sounds like masters maybe more of a focus on dedicated platforms, less retrofitting, more partnership, etc. Chauffeur, maybe you can give us some sense. I know that part of the engagement conversation that you mentioned, but how significant is your spend on Chauffeur right now. What is the interest in Chauffeur—your customers are seeing this as sort of an evolution of SuperVision, so it's very aligned with the SuperVision spend or is this a separate stream and it's something that maybe the timing is getting pushed out a bit more and that's playing into the OpEx commentary.

Amon Shashua

It's very aligned with SuperVision. You can think of it as having incremental addition to SuperVision. SuperVision it's mostly camera based, there are some radar as an option. For example in the Zeekr001, there is a front facing radar. In the Porsche program there's also surround radar. When you go to Eyes-off, the Chauffeur, you're adding some LiDAR's as well in order to break more redundancy and a bit more compute instead of two EyeQ 6, that we have in the Porsche program, it's three EyeQ 6.

So it's really incremental. The heavy lifting is not so much on the development; it's on the validation. That's because you need to prove that you are multi-fold times better than human statistics, crash statistics, and that creates an effort of validation. This is something that we're working together with the OEMs. We are creating Hardware-in-the-Loop farms of thousands of ECUs for each program. For example, for the SV62, for the CH63, for the DR64, each one having a Hardware-in-the-Loop farm of many, many thousands of ECUs in order to run through thousands of hours of data per night. This is ongoing and part of our budget. Part of our OpEx growth. It's not something that we did not anticipate or could come as a surprise.

In terms of OEM traction, we're in serious engagement with a number of OEMs. I believe that at least two of them will be able to close the deal.

Dan Levy

Great. Thank you.

Dan Galves

We can only take one more question.

Operator

Okay. Our next question comes from Adam Jonas with Morgan Stanley. Please go ahead.

Adam Jonas

Hi. Thanks everybody. What are you thoughts on the advantages or disadvantages of using custom silicon versus GP, such as in Nvidia A100 for vision neural net training. Curious what Mobileye's strategy is regarding custom versus GPU and is there any effort to move towards a custom system in a vertically graded way some of your competitors are?

Amon Shashua

Our system is vertically integrated. We have an EyeQ chip but instead of GPUs, we have our own accelerator family. We have five different families of accelerators and that's what makes our chip very efficient. On paper, the total comps is 30 something compared to one tenth of the comps on paper of the competing solution and you don't see any advantage in terms of performance for the competing systems. We have highly efficient solution and the advantage of a highly efficient solution, it costs our consumption, the size of the ECU and you need to cool it. Power is really important when we're talking about an electric vehicle.

Our approach, which is not a general purpose chip like the A100, it's really customized to the type of workload that we need in order to power both computer vision and driving policy at great advantages of efficiency.

Dan Galves

Thank you so much. Thanks everyone for joining the earnings call. We will talk to you next quarter. Thank you.

Operator

This concludes today's conference call. You may disconnect your lines at this time. Thank you for your participation and have a great day.