Mobileye Global Inc.

Fourth Quarter and Full Year 2022 Earnings Conference Call

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PRESENTATION

Operator

Greetings. Welcome to the Mobileye Q4 2022 Business Update.

At this time, all participants are in a listen-only mode. A question-and-answer session will follow the formal presentation. Please note this conference is being recorded.

I will now turn the conference over to your host, Dan Galves. You may begin.

Dan Galves

Hello, and welcome to Mobileye's Fourth Quarter and Full Year Earnings Conference Call for the periods ending December 31, 2022.

As a matter of formality, 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 risk 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 Anat Heller, Mobileye's CFO.

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

Prof. Amnon Shashua

Thank you, Dan.

Hello, everyone, and thank you for joining our earnings call.

2022 was really a really important year for Mobileye. We executed a successful IPO at a time when this was only possible for very unique companies. I see many benefits to being public again, but most important is we've already seen a big increase in visibility of Mobileye from our customers and partners, driven by more focus and attention by the broader media and analysts. This drives incremental business opportunities by amplifying attention on our advanced solutions and we think this plays into the incremental momentum we are experiencing.

Financial results in 2022 were clearly very good. Revenue grew by 35%, adjusted operating profit grew by 25%, and we generated almost $550 million of operating cash flow. More important than those headlines is that the source of our growth started to shift from pure volume to a combination of volume and higher content per vehicle. Our advanced products carry much higher price per vehicle than our historical products and we saw clear evidence of that in 2022, where one-third of our revenue growth came from higher ASP's.

In terms of future business generation, 2022 was a record year. Just in that year alone, we generated new business representing $6.7 billion of estimated future revenue at about $105 per unit on a content per car blended basis. This is about three-and-a-half times our actual revenue in 2022, and double our current ASP. Overall, we estimate that our current book of business represents over $17 billion of total future revenue through 2030. As long as our new business wins continue to outpace our actual shipments in a particular year, this number will continue to grow. Also, to be clear, this number excludes our Consumer AV and Mobility-as-a-Service backlog.

Beyond the high-level numbers, we saw positive business trends across all business lines. The front-facing camera, single chip ADAS business continues to run like a machine. We grew revenue with every one of our top 10 customers in 2022, and continue to win significant new business in this segment. A key development in 2022 is that many large-volume ADAS platforms now have a variant that includes Cloud-

enhanced ADAS through our REM map. This volume will drive higher ASP and recurring revenue from maintenance of the map.

We also saw a very significant uptick in interest and secured volume in our SuperVision product in all regions from both traditional and start-up OEM's, really, across the board.

There are many reasons for the increased traction:

- There is a big difference between a development product and a launched product. Launching SuperVision with ZEEKR in China was a major catalyst in driving interest from other OEM's. A program like SuperVision is a major commitment for an OEM, in time and capital. Offering a solution that is already in production means that the investment will result in a valuable product with high probability. This is very important in the current environment.

- Number two, we now have the ability to demonstrate the full feature set of SuperVision anywhere, not just in Israel. Our REM maps now cover nearly all roads in the U.S. and Europe. As a result, we have been able to execute long-distance expeditions with car maker customers covering thousands of miles in both U.S. and Europe with little human intervention. This ability to show that the technology truly works everywhere has been critical in moving discussions to the decision phase.

- Mobileye's EyeQ Kit software development tool is another important development. The ability for an OEM to take Mobileye's truly differentiated assets, like surround computer vision, REM mapping, and our decision-making software as is, but then customize the consumer-facing parts of the system with their own software, is something we couldn't offer until recently. It has served as a catalyst for strategic partnership discussions for SuperVision and beyond with many of our OEM customers, particularly ones that began their own software development the earliest.

- In the meantime, the competitive environment among OEMs has ramped up with Chinese automakers and Tesla benefiting from surround camera-based systems, both in profit and technology prestige. This is creating an overall sense of urgency among other OEM's to invest in wide Operational Design Domain eyes-on/hands-off systems that have high probability of success in terms of performance and validation.

We expect SuperVision to be a very large growth driver in 2023, and beyond, and shared our expected volume forecast in our CES presentation, which is available at our IR website, but this product also serves as a launch point for our eyes-off consumer AV product Chauffeur. Because SuperVision operates across a very broad Operational Design Domain, it makes the transition to a series of eyes-off ODD's an incremental and modular step, instead of a series of moonshots. In other words, all the heavy lifting of describing the environment in great detail, the driving policy required to maneuver the car in any traffic scenario and the requirement for high-definition maps covering all types of roads are all done in the SuperVision system. From here, adding redundancies to the perception system to take eyes-on to eyes-off becomes incremental work.

The successful productization of SuperVision with ZEEKR and this concept of modularity to eyes-off has created a lot more interest from our customers to develop Consumer AV products. Essentially, every SuperVision discussion we are having now is also including scope for a follow-on Chauffeur eyes-off program.

We saw recent evidence of this with a premium European OEM which kicked off a SuperVision program in Q4. During discussions, the scope of the program expanded to include a Chauffeur program that will

launch in the 2026 timeframe. The Chauffeur portion of this program alone represents an expected $1.5 billion opportunity through 2030.

Finally, on Mobility-as-a-Service, our plan continues to develop relationships on the supply and demand side, and then use our self-driving system to enable supply and demand to come together into a scalable business. We have many relationships on the demand side with transportation network companies and public transit operators. We also have engagements with three vehicle builders which are developing purpose-built vehicle platforms that integrate our Mobileye Drive self-driving systems. We expect to generate our first revenue in this business in 2023, and our supply side relationships have orders for self-driving systems that total an estimated $3.5 billion of future revenue through 2028.

So, overall, 2022 was the year where traction for SuperVision really accelerated and this led to an increased interest from OEM's for eyes-off systems, as well. Continuing the productization process of these solutions and supporting testing and launch, of course, requires resources. This is why our operating expense growth in 2022 was unusually high, and it will be again in 2023. This growth is supporting areas like growth in teams to support SuperVision launches with OEM's, radar and LIDAR productization, an expansion of Mobility-as-a-Service validation and testing sites, and development work of our next generations of our EyeQ chips. I would note that approximately 70% of our R&D expense is related to products that are either just beginning to generate revenue, like SuperVision, or are still pre-revenue, like Chauffeur, Drive and the active sensor array products.

Thank you, and I now turn it over to Anat to go through the results.

Anat Heller

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 in Mobileye's non-GAAP numbers is amortization of intangible assets, which is mainly related to Intel's acquisition of Mobileye in 2017. We also exclude stock-based compensation and IPO-related expenses.

Starting with a few words about the full year, revenue growth of 35% year-over-year in 2022 continues our consistent track record of top line growth. Compared to 2018, our revenue is up 170% and global production is down 13%.

As Amnon mentioned, our advanced portfolio made a meaningful impact on Average System Price, which rose to $53 in 2022, up from $47 in 2021. That alone drove about 13 points of revenue growth in 2022. The increase in Average System Price was mainly driven by SuperVision, as well as, to a lesser extent, the rise in chip cost which we passed along to our customers.

The addition of SuperVision to our product mix led to a certain decrease in gross margin as we deploy a full system solution which contains higher hardware content, but, more importantly, SuperVision generates much higher gross profit per unit than our core EyeQ product. As a result, EyeQ and SuperVision combined gross profit per unit rose by 9% in 2022.

Turning to Q4, revenue grew 59% year-over-year. Our EyeQ-related revenue was up 48%, with the SuperVision product driving most of the remainder of the growth, despite being less than 1% of our overall volume.

Q4 operating margin was 38%, up from 34% in prior year. This was above our guidance expectations, due to better than expected revenue growth, but also due to about $14 million of R&D expenses that we expected in Q4 but shifted to 2023.

Turning to 2023 guidance, we are pleased that the midpoint of our guidance remains in line with internal expectations at the time of our October IPO, despite overall macro assumptions for 2023 coming down since then.

On the revenue side, I'll give you a sense of our assumptions. Focusing on the high end, we are assuming EyeQ volume that is somewhat below the commitments that we've received from our customers for 2023. We want to remain conservative and acknowledge that macro uncertainty remains elevated. That volume level corresponds to about 1% global production growth, four to five points of ADAS adoption growth, which is somewhat lower than the prior few years, and consistent market share.

On the SuperVision side, we are assuming a bit more than 100% growth versus 2022, which was about 96,000 units. Demand is higher than this, but we are still experiencing some supply chain constraints in one particular component of the ECU. On the positive side, we have commitments from our suppliers at the level we are forecasting, including a second half run rate that supports our 2024 forecast, as well.

In terms of quarterly cadence, historically, our revenue has ramped up over the course of the year. This year is expected to be even more pronounced, with around 41% of revenue expected in the first half of the year. On both the EyeQ and SuperVision businesses, volume and revenue are expected to be lower in Q1 2023 versus Q4 2022. This appears to be general conservatism on the part of our customers, as well as some impact from elevated purchases ahead of the EyeQ price increase that went into effect on January 1. On SuperVision, the lower volume in Q1 and Q2 versus Q4 2022 is related to the key ECU component mentioned earlier.

On the Average System Price side, we expect Q1 and Q2 to be a bit lower than Q4 due to the SuperVision constraints, but we expect to exit 2023 in the low 60's, which is an excellent trajectory.

On the operating income side, there's a few things to point out. Gross profit per unit will increase again year-over-year, but the percentage gross margin is expected to be down due to the higher mix of SuperVision revenue mentioned above. On the OpEx side, as Amnon mentioned, we will continue to invest heavily in our high-ROI advanced portfolio, which is only beginning to impact our results. We estimate operating expenses to grow in the low 30% range in 2023, versus 35% growth in 2022. OpEx growth rates are expected to moderate in 2024, which, combined with operating leverage, is expected to lead to higher operating margin during that year, also consistent with our internal expectations at the time of the IPO.

Before taking your questions, I just wanted to thank my team and many others at Mobileye for supporting what is a pretty accelerated earnings timeline for a newly public company.

Thank you, and we will now take your questions.

Operator

At this time, we will be conducting a question-and-answer session. One moment, please, while we poll for questions.

Our first question comes from the line of Itay Michaeli with Citi. Please proceed with your question.

Itay Michaeli

Great, thanks. Hello, everybody. Just two questions, one financial and one on SuperVision. On the financial, maybe for Anat, I'm hoping you can maybe talk about what you're expecting for gross margins just in the kind of core ADAS and enhanced ADAS business in 2023. Then, on SuperVision, I'm hoping you can talk about what portion of customer engagements are perhaps looking at a camera-only solution for SuperVision, as well as what you're seeing for the SuperVision light offering versus the full ODD SuperVision offering. Thank you.

Anat Heller

Great. So, on the EyeQ side, we are seeing consistent gross margins through 2023. On the SuperVision side, we're seeing approximately 35% for this year.

Prof. Amnon Shashua

Okay, I'll add a bit more, that with the SuperVision, there are two drivers to increase our gross margin there. One is efficiency of production. We are creating a new version, an Evo version with lower cost to increase our margin. Second is customer bundles. The launch of SuperVision in China at the moment, it's highways. The urban and arterial roads will be unlocked during 2023, and that will also increase our revenue of content per car, and of course, naturally, will increase the gross margin. We are targeting reaching between 50% to 60% gross margin of SuperVision kind of in the long run.

In terms of your second part of the question about camera-only, SuperVision is a camera-only plus a front-facing radar. For example, on the ZEEKR vehicle, there's a front-facing radar, as well. Although we can satisfy all the functionality without the radar, but having front-facing radar adds another element of redundancy, which can improve the MTBF of the system.

In terms of SuperVision light, this is a product offering which has been done very recently, so we don't yet have traction for it. All the traction that we have, and is growing, is for the full SuperVision, with EyeQ 6 and the full camera suite.

Itay Michaeli

Perfect, that's all very helpful. Thank you.

Dan Galves

Thanks, Itay.

Operator

Our next question comes from the line of Mark Delaney with Goldman Sachs. Please proceed with your question.

Mark Delaney

Yes, thank you very much for taking the question. With respect to the opportunity for Mobileye with some of your more advanced solutions, like SuperVision, can you elaborate a bit more on the breadth and depth of the discussions you're having with OEMs to use those products relative to, say, 90 or 180 days ago, and if you're seeing that traction improve with just a few programs and OEMs or if perhaps it's broader based?

Prof. Amnon Shashua

As we said, we have now SuperVision, you know, design win into six carmakers, nine brands. The scope is expanding toward Chauffer, the eyes-off system, and additional SuperVision traction we expect to come out in the second half of the year.

Dan Galves

We have customers that we haven't named yet, but I think, yes, the additional traction in the second half would be ones outside of those six OEMs.

Prof. Amnon Shashua

Yes.

Mark Delaney

That's very helpful, thanks, and one more for me, please, if I could. The Company has had its supply chain limits, including for SuperVision, and you called out an ECU component. Can you elaborate a bit more on the steps that Mobileye and your supply chain partners are taking to alleviate that, and your visibility in potentially having that supply chain constraint alleviated in the intermediate to longer term? Thank you.

Prof. Amnon Shashua

We have an issue with one component in the SuperVision motherboard. This is why we have, out of the full volume of SuperVision, it's really tilted towards the second half of the year, rather than the first half of the year. It's one component from a particular supplier. We are confident that in the second half of the year that constraint will be alleviated and we can deliver the rest of the volume.

Dan Galves

Yes, maybe if I could just add a couple more words on this. In 2022, we delivered every ECU we could possibly produce, and in the fourth quarter, it was a little bit more than we had expected to be able to access. We have so much additional demand in 2023, that in order to satisfy that the supplier really needed to sort of take down the production for a period of time in order to install more capacity so we could get to much higher levels, and I'd just reiterate what Anat said, in the second half, we have commitments to be at a run rate that would satisfy not only the 2023 demand, but also get us to a capacity where we could satisfy 2024, as well.

Thank you, Mark. Next question, please.

Operator

Our next question comes from the line of Joshua Buchalter with Cowen & Company. Please proceed with your question.

Joshua Buchalter

Hey, guys, thanks for taking my questions, and congrats on the results. I guess I wanted to ask first about the premium European automaker that you announced for SuperVision. Any way you can give us sort of a, I don't know, scope versus what you're currently doing with ZEEKR in China, and, in particular, how

much does moving to, it sounds like, hands-off/eyes-off with that program, how much that can be a material needle-mover, the potential for that program? Thank you.

Prof. Amnon Shashua

With respect to eyes-off we announced with ZEEKR, we streamlined the hardware at the time that we announced it. It was with six EyeQ 5 chips. We are now streamlining it to one piece of hardware called CH63, so three EyeQ 6, that will be in the 2025 timeframe. We have an additional OEM with an eyes-off, and an additional one -- this European which is not yet named -- for a 2026 timeframe, and there's a potential additional one, which I believe could be announced in the second half of the year, for an eyes-off system based on the three EyeQ6.

Joshua Buchalter

Thanks, I appreciate the color, and then I wanted to ask about your R&D and OpEx spending. You called out—it was helpful color giving the 70% number on forthcoming products, but you have a lot of irons in the fire and I was wondering if you could rank order where are your spending priorities, which ones are the ones that you're particularly focused on and excited about between, let's say, AMaaS, Consumer AV, but even bringing your own internal LIDAR and radar to market, as well as just broader software adoption, like mapping. Thank you.

Prof. Amnon Shashua

Our expenses, it's very diverse, and you mentioned a number of them. We have expense on active sensors, radar and LIDAR. There, we are working on productization in the middle of 2024 timeframe, both of the radars and the LIDARS, so this is ongoing. We have expense on mapping, on the REM mapping. This is mostly compute. The headcount is not much increasing, it's really the compute that is increasing, based on more and more programs that require mapping. We have expense in R&D as we go forward from SuperVision to Chauffer to DRIVE, which is the Mobility-as-a-Service, that's another source of expense. We have expense on SuperVision to support those six carmakers. This is very diverse. It's hardware, just like as a Tier 1. It is software, not algorithmic software, but more infrastructure software. There's a lot going on there to support six carmakers with SuperVision, all coming around the same timeframe, starting from 2024 till 2026, so this creates also a need for investments. So, our investments are very diverse. We think that—last year, 2022, we made a jump on investments, this year another jump, and it will taper off from 2024 forward.

Dan Galves

I would just say, you know, the last thing I'd say on that is it's all supporting the portfolio that we've talked about for the last few months with so much value and additional content per vehicle.

Joshua Buchalter

Got it. Thank you.

Dan Galves

Thanks, Josh.

Operator

Our next question comes from the line of Chris McNally with Evercore ISI. Please proceed with your question.

Chris McNally

Thanks so much. A quick one on just the numbers and one on orders. Just on the timing for gross profit progression in 2023, it looks like you're going to be down something like 400 basis points, and I think you've explained that that's the STM increase on the chip side. Could you just help us—does that passthrough happen as early as Q1, Q2. Obviously, it doesn't matter for gross profit dollars, but just for the gross profit margin walk, could you just help us on the timing?

Anat Heller

The timing is from January 1. As already said, or discussed, it was increased at the beginning of the year, we're passing it over to our customers without additional margin, and this is the reason for a slight decrease in our margin for EyeQs.

Dan Galves

Yes, and the second thing that we mentioned in the prepared remarks was SuperVision becoming a bigger mix of our revenue, you know, has kind of a mathematical effect on the percentage margin. Gross profit per unit is much higher, but gross margin is lower. But, that'll be a bigger effect in the second half because the volume of SuperVision is significantly higher in the second half.

Chris McNally

Great, and then on the Chauffer win, obviously, congrats, if it's the scale of OEM that a lot of us think, that's a huge deal, but can you talk a little bit about just the timing of some of these SuperVision walks into Chauffer? I mean, if you're talking about launches in SuperVision in '25, what's a typical sort of conversation around that transitioning to Chauffer, is it '27, is it '28, and then any idea of are we starting with Level 3 and then working up to Level 4, because it's obviously such an important sort of part of the latter half of the decade? Just curious when these programs may launch.

Prof. Amnon Shashua

In our view, there's no difference between Level 3 and Level 4, it's an eyes-off or eyes-on system, but this is what I spoke about at CES. So, an eyes-off system with OEMs, except ZEEKR, that starts in 2025, the rest of the OEMs are starting in 2026. We have quite a nice traction, as I said. Three OEMs, and the fourth one should be closed the second half of this year for eyes-off systems for 2026.

Dan Galves

Yes, because SuperVision really serves as the baseline, you know, the timing gap between a SuperVision launch and a Chauffer launch doesn't have to a be a significant number of years.

Chris McNally

That's great, and just to confirm, in the prepared remarks, you said that most of your SuperVision conversations, you're having discussion of this walk to Chauffer.

Prof. Amnon Shashua

Yes. It's not most – it's all. Every customer that bought into SuperVision, we have a meaningful and deep discussion about expanding to Chauffer.

Chris McNally

Thanks so much.

Dan Galves

Thanks, Chris.

Operator

Our next question comes from the line of Antoine Chkaiban with New Street Research. Please proceed with your question.

Antoine Chkaiban

Hi, and thank you for taking my questions. Maybe a quick one first. I was wondering where you stand on growing the key mapping-based features via the OTA updates through the current users in China, and what features that—exactly what additional features we should expect in the upcoming updates, as well.

Prof. Amnon Shashua

In China, with ZEEKR, about three months ago we OTA-ed Highway Assist. Recently, we OTA-ed to leading customers the full SuperVision limited to highways. This is including the REM maps as part of it. We believe that in the next month or two months, we'll be able to do the OTA for the entire fleet with full REM capability of SuperVision for highways. Then, throughout 2023, together with ZEEKR, as our map coverage will increase, we'll start unlocking additional road types, like arterial and urban.

Antoine Chkaiban

Okay, thank you, and maybe as a follow-up, a broader follow-up, I think one important differentiating factor that Mobileye has is that you offer an end-to-end solution, while your main competitor today offers, really, like a reference platform. Can you help us better understand how in practice the integration work differs when you kick off a development product versus what your main competitor does? I am assuming that in the case of the other offerings out there, there is still some significant development work that needs to get done by the OEMs themselves, but anything you can tell us on how things typically happen in practice would be very helpful.

Prof. Amnon Shashua

Mobileye, in SuperVision, is offering an end-to-end system. So, the ZEEKR is an end-to-end system. All the other SuperVision launches that I talked about, the six OEMs and nine brands, are still an end-to-end system. Vertical handle of an end-to-end system, I think is crucial, because you are talking about perception, you are talking about integrating with a map. The map is built together with the teams that are building the perception. If you try to separate the map from perception to two different suppliers, you get into a sea of issues. Either it will be over-engineered or it will be under-engineered. Cost-wise, it could be crazy. The fact that the same team is integrating both the sensing, both the perception and the way the map is being built and served, it's crucial. Then, you have driving policy. The driving policy is also integrated with perception. Again, if you try to separate that into a supplier doing the driving policy and another supplier doing the perception, you end up with an over-engineered system, and in some places it

will be under-engineered. It would be too conservative, too slow. So, I think, in such a complex system, an end-to-end where everything is done by one supplier has a lot of advantages, and has also not only performance advantages, but also cost advantages. Everything under one house, under one chip, it offers incredible cost advantages.

But, we are not shy from cooperating in other ways. For example, there are OEMs that would like to take control of the driving policy, where Mobileye provides only the perception, and we're open to that. This is why we offer the EyeQ Kit, which enables the OEM or a supplier to write code onto our chip on top of our software, whether it is fusion with other sensors, whether it's a driving policy. We don't resist that. But, having an end-to-end system can be much more efficient than breaking it down to different suppliers.

Antoine Chkaiban

Very helpful, thank you.

Dan Galves

Thank you, Antoine. Thanks a lot. Next question, please.

Operator

Our next question comes from the line of Vijay Rakesh with Mizuho. Please proceed with your question.

Vijay Rakesh

Yes, hi, guys. Great quarter. Just a quick question on SuperVision, just to go back to that. In terms of the six OEMs, outside Geely and ZEEKR, can you give us some idea of, as they ramp in the second half, and you talked about significantly higher SuperVision volume there, what kind of volumes are you looking at at the OEMs, outside of the two – Geely and ZEEKR -- for the other OEMS?

Anat Heller

It's only on ZEEKR.

Prof. Amnon Shashua

Yes, but did we say the number of the volume. No, we did not reveal the actual volume, but I think—what did we reveal there?

Dan Galves

We said that we will more than double volume in 2023 for the overall year …

Anat Heller

For the overall year, and the first half will be much weaker than the second half.

Dan Galves

Yes, we're not revealing specific quarterly, but we talked about revenue being about 40%, 41% in the first half versus the second half, that's a combination of EyeQ and SuperVision, but, yes, the second half ramp-up of SuperVision is significant because of the new capacity that's coming online.

Prof. Amnon Shashua

Overall 2023 SuperVision will be more than double of 2022, so more than 100% year-on-year growth.

Vijay Rakesh

Got it, and then as you have these OEMs accelerate into '24, we should probably expect—you talked about kind of building capacity for that—we should expect that side to kind of grow pretty nicely into '24, as well, right?

Prof. Amnon Shashua

Yes. So, 2024, there will be additional OEMs. It's not only ZEEKR. Currently, ZEEKR is 001, that's one brand. There's another brand of ZEEKR coming to launch throughout the end of 2023, beginning of 2024, and then there are additional Geely OEMs that are kicking in in 2024, and then 2025, we're talking about OEMs outside of the Geely group.

Vijay Rakesh

Got it, and just quickly on the—I know in '23, you have on the core EyeQ side, you have Toyota ramping. Can you talk to what drove the win, how you were able to kind of, you know, displace incumbents, what really drove that win, and that will help all of us? Thanks.

Prof. Amnon Shashua

The win with which?

Dan Galves

With Toyota.

Prof. Amnon Shashua

With Toyota. That was a design win of two years ago. I don't think we displaced anyone. It was a bid and we won the bid. The program is ongoing, it hasn't launched yet.

Vijay Rakesh

Got it. Thank you.

Dan Galves

Thank you, Vijay.

Operator

Our next question comes from the line of Adam Jonas with Morgan Stanley. Please proceed with your question.

Adam Jonas

Hey, everybody. I was wondering if you can give a little bit of guide on Capex, where is it going, even directionally, in ’23, and I’m curious if operating cash flow can keep pace with growth in operating profit, or does that kind of lag, as well, given some of the expenses?

Anat Heller

We expect Capex to be similar to the investment in 2022. Our new campus is planned to be completed during the second quarter and additional investment for completion is about $60 million. The remaining Capex investment is related to storage, data centers and computer (inaudible), and such.

Adam Jonas

Thanks, Anat, and just a follow-up. Could you help quantify the shifted engineering expenses that shifted from 4Q into ’23, either in margin or dollar terms, and the same, I guess, if you could, if it’s possible to quantify the pull-forward of volume ahead of the price increase, but mainly the engineering expense is something I would hope you could just help quantify for bridging purposes? Thanks, Anat.

Anat Heller

Yes. So, it’s about $14 million that shifted from this year …

Dan Galves

One four.

Anat Heller

One four, 14.

Anat Heller

To be clear—from this year to next year. It’s mostly about NRE expenses, but it’s not a very significant number of the total of expenses in 2023.

Adam Jonas

Thank you.

Anat Heller

Thank you.

Operator

Our next question comes from the line of Samik Chatterjee with JPMorgan. Please proceed with your question.

Samik Chatterjee

Hi, and thanks for taking my questions. I guess for the first one, I was just wondering if you can talk about what are you seeing on the enhanced data solutions, particularly in terms of being able to upsell customers when it comes to sort of basic ADAS and and REM. On that, how much—you talked about the

ASP increase you're expecting for 2023, but how much of that is going to be driven by being able to sort of sell enhanced data solutions for the basic ADAS, and how are you seeing OEMs adopt it at this point, is it really more of a high end sort of adoption or are they looking a bit more down-market, and I have a quick follow-up? Thank you.

Prof. Amnon Shashua

Beyond Volkswagen, that launched a year ago with the Travel Assist 2.5, we have now two additional OEMs with big programs, with cloud-enhanced ADAS, and it's ramping up. I believe, at the end of the day, every carmaker with a front-facing camera would include also as an option -- maybe a higher trim option -- an enhanced ADAS, because it doesn't add any hardware to the mix, it's just a software update, and it makes a lot of sense. By significantly increasing the ADAS capability by having the data from the cloud about where the lane marks are the driver will pass, the location of traffic lights, association with traffic lights the driver will pass, all of this creates new opportunities for enhancing driving assist at quite a reasonable cost of, you know, a few tens of dollars per car per year, or something like that.

Samik Chatterjee

Okay, got it, and for the follow-up, we get a lot of questions about sort of how to think about performance in the recession and kind of if the macro was to get worse. I know you talked about sort of hair-cutting some of the OEM demand that you're seeing and some volumes, but how are you sort of thinking about the likelihood of push-outs, particularly if programs are planned towards the end of the year, pushing out timelines in terms of launches or of adoption of certain programs, and also how would you sort of flex your OpEx in the scenario that the macro does end up being a bit worse? Thank you.

Dan Galves

This is Dan. Obviously, we're susceptible to swings in global production a bit, but as you've seen in the past years, we're growing so much faster than overall production, that it's not as big of an impact to us as probably to others. We acknowledge kind of the risks around production, and that's why we set our forecast to basically flat to 1% global production growth and set our volume forecast below the orders and commitments we've gotten from our customers. We're definitely not hearing about any kind of, like, push-out of programs, or anything like that. Also, we have the driver of adoption growth that wouldn't impact us too much, as well. But, just to be clear, not hearing anything about that. Overall, we've done well in all kinds of environments over the last 10 years, and in terms of flexing operating expenses, I don't think we would. I think that our business is built for the long term to drive content per vehicle growth, to drive new solutions for the next 10 years plus, so I don't think we would pull back on operating expenses.

Samik Chatterjee

Got it, thank you. Thanks for taking my questions.

Dan Galves

Thanks, Samik.

Operator

Our next question comes from the line of Luke Junk with Baird. Please proceed with your question.

Luke Junk

Good morning. Thanks for taking the questions. First, I wanted to ask—so we've talked about SuperVision quite a bit, cloud-enhanced ADAS, as well. I'm wondering about EyeQ Kit, if we could discuss the evolution of those conversations with customers, how that's developed over the past six-plus months, let's say, and could it, or has it been, intersecting with SuperVision at all at these customers?

Prof. Amnon Shashua

Yes, indeed, all the advanced systems, Chauffer and SuperVision, EyeQ Kit comes as a critical component, especially when you talk about Chauffer. Some of the SuperVision programs include, also, EyeQ Kit, some do not. But, EyeQ Kit is becoming a major component in our discussions of advanced systems. Advanced system is something beyond SuperVision and beyond.

Luke Junk

Thank you for that, and for my follow-up, I just want to ask a question on nearer term expectations. In light of the component issue that you said with SuperVision, which sounds like it's just timing, and the timing of expenses, are there any additional guardrails we should be keeping in mind when it comes to near term, especially first quarter, expectations? Thank you.

Dan Galves

Can you repeat the question, Luke? Sorry about that?

Luke Junk

Yes. Sorry about that. So, the question is, in terms of the first quarter on the financial side of things, clearly, we want to be looking at timing around SuperVision and component availability, expense timing, as well, around R&D. I'm just wondering if there's any additional guardrails or things that would be specific to the first quarter we should be keeping in mind, beyond just the revenue weighting first half versus second half, let's say. Thank you.

Dan Galves

Yes, I mean, I think we covered that, we think Q1 revenue will be below Q4, we're not going to get more specific than that, and kind of talked about the reasons. I mean, every year, we have more revenue in the back half versus the first half. We do think it's going to be a little bit more pronounced this year because of the constraints on SuperVision supply in the first half, as well as we do think that there was some additional buying of EyeQs before the price increase, which I think is natural, we don't think it was major. But, that's our read of why Q1 is a little bit below Q4. Hopefully, that gives you enough information.

Thanks, Luke.

Operator

Our next question comes from the line of Raji Gill with Needham & Company. Please proceed with your question.

Raji Gill

Yes, thank you, and congratulations on great results. A question on the ASPs. You mentioned that a third of your revenue growth last year came from higher ASP growth, and this appears to be a very strong kind

of investment thesis as your ASPs kind of move higher. How do we think about the balance between kind of unit growth versus ASP growth as you kind of ramp up more of the SuperVision products?

Anat Heller

There's a big difference between ASP of EyeQ and SuperVision. Therefore, when you're growing with the volume of SuperVision, you don't need to grow a lot in order to produce these—or generate this higher revenue, so there's a big difference there, and we think that as we go further with higher SuperVision in the mix, you'll see this ASP continue to grow.

Dan Galves

Exactly. I mean, I think we have a lot of visibility on content per vehicle growth. The design wins that we achieved in 2022 came in at $105 per unit on a blended basis. That's a mix of base EyeQ, cloud-enhanced ADAS, SuperVision. SuperVision was definitely the biggest contributor to the year-over-year growth in ASP that we saw in Q4, even though it was like 0.5% of the volume, and like we said in the prepared remarks, we see a trajectory to the low 60s in the back half of 2023, still with really one customer, plus an additional Geely brand in the back half, so it's a very powerful driver, and the fact that Chauffer is becoming a bigger part of the discussions with OEMs, it brings even more potential upside in the future. It takes time to play out, like everything in this business, but we're feeling really good about the content per vehicle trajectory.

Raji Gill

I appreciate that, and for my follow-up, a lot of the questions we receive from investors is trying to analyze the evolving competitive landscape with very large semiconductor suppliers, as well as some niche competitors that are developing certain types of computer vision applications, so I'm wondering, as you are increasing the content per vehicle, as you're adding and kind of upgrading and upselling your customers to higher levels of autonomy, how do you currently see the competition and how do you foresee it evolving as OEMs kind of adopt higher levels of autonomy? Thank you.

Prof. Amnon Shashua

I think when you go to those high levels of complexity of systems, the semiconductor is really a small part of the mix. You have so much on top of the semiconductor. You have the perception software, the driving policy software, the control of the car software, the mapping, the integration of all of them together. It is way, way beyond the semiconductor business. Even when you talk about the basic ADAS, which is a front-facing camera with a chip behind it, the optimization and the economy of scales over the last decade of this particular product makes it very, very unlikely to a newcomer to gain market share. It's highly optimized. The validation, it's very, very expensive, requires hundreds of petabytes of data to properly validate. If you don't have any disrupting new idea there, being able to take market share in that particularly highly optimized business is very, very unlikely, right, unless the incumbent, for some reason, stops to deliver, and I don't see us stopping to deliver.

So, really, the gain in terms of market share is on the complex systems, SuperVision, and beyond, and I think there Mobileye is clearly at the very, very leading position. A SuperVision type of product, I don't see anything, outside of the Tesla FSD, that even comes close to it. We are having a very strong traction for it, more and more carmakers, more brands. Chauffer is another step up. So, this is where the competitive gain is going to be, not on the low end ADAS, and there, it's way beyond a semiconductor business.

Dan Galves

Thank you, Raji.

Raji Gill

Appreciate that, thank you.

Operator

Our next question comes from the line of John Murphy with Bank of America. Please proceed with your question.

John Murphy

Hi, guys. Just two quick ones. First, if you could discuss exactly what went on with the January price hike, so we can understand why folks may have prebought in front of that, just to understand how big that is. Then, the second one, as you're making this progress with SuperVision, as far as booked business and discussions, are the customers just kind of throwing up their hands and saying, "Listen, we just can't do this ourselves or with these other partners, so we're just kind of handing the keys and becoming exclusive with you," or are they sort of parallel processing other systems, and how is that developing?

Prof. Amnon Shashua

I don't think the story is so dramatic as trying to get the keys, right? OEMs do what makes the most sense. They want to deliver products, they want to deliver competitive products. They need to compete with other OEMs. They need to provide value to the customers. They see what Mobileye is doing. I think the launch of the ZEEKR SuperVision created kind of a significant moment. Because, it's one thing to show a development system, another thing is to show a production system doing something very impressive. It's not that OEMs decided to throw in the towel. It's simply a natural evolution of a competitive landscape. You need to be able to deliver brands with the best technology and use the suppliers for it.

The EyeQ Kit allows the carmaker—I think the EyeQ Kit was a very important moment here. It allows the carmakers not to completely tweak our system as a black box, but to add to it their own software and to create further differentiation. But, trying to simply replicate what Mobileye has been doing, personally, I don't think it makes sense, really, because I know the amount of investment that's being done, and this kind of investment cannot be done just through money. There's a time factor, a significant time factor for it. So, I think the ZEEKR launch created kind of a reality check in many of our OEM partners.

Anat Heller

And about the EyeQ cost …

Prof. Amnon Shashua

Yes, in terms of the EyeQ cost, we're talking about …

Anat Heller

One to two dollars of an increase.

Prof. Amnon Shashua

One to two dollars.

Anat Heller

It's not a significant increase in terms of buying ahead, you know, before this price increase.

John Murphy

Thank you very much.

Dan Galves

Thanks, John. This is going to be our last question.

Operator

No problem. Our last question comes from the line of Steven Fox with Fox Advisors. Please proceed with your question.

Steven Fox

Hi, good morning, and thanks for squeezing me in. Two questions, if I could. First of all, at CES, the conversation around your radar innovations were pretty interesting. I was wondering, beyond just the technology roadmap, what else is going to drive your ability to start disrupting in that product space. I guess you're talking about going to market in 2024 to try to win new business. Then, secondly, as you sort of right-size for the volumes needed on SuperVision by the end of this year with your manufacturing partner, is that when we should start thinking about gross margins in SuperVision improving, or do we need more volumes beyond like end of calendar '23 to start to seeing that improvement? Thank you.

Prof. Amnon Shashua

Yes, I'll start with the second half of your question. The gross margin in terms of the cost of production is not volume-dependent. We simply did another spin of the hardware with better optimized components, so that would reduce our cost. Another part of increasing our gross margin of SuperVision is it's higher bundles. Once software bundles will include beyond highway, that will increase our gross margin.

What was the first half of your question?

Anat Heller

Radar.

Prof. Amnon Shashua

Radar. It's important to mention that our motivation for building those radars is not just to enter into a new marketplace. It was to create a very streamlined kind of system where you don't need a 360 degree awareness from LIDARS, because that is expensive. We want to limit the LIDAR only for front-facing, and the remaining 360 to be handled by imaging radars, and those imaging radars that we are developing are really cutting edge in terms of 48 x 48 channels, 100 DB of sensitivity, and they can create an end-to-end autonomous driving experience as another layer of redundancy, and that would considerably reduce the cost of an eyes-off system. I'm talking about an eyes-off with full capability, full ODD.

Steven Fox

Great, that's very helpful. Thank you so much.

Dan Galves

Thanks, Steven.

Thanks, everyone, for joining our first earnings call as a public company, and we will see you next quarter. Thank you.

Prof. Amnon Shashua

Thank you.

Anat Heller

Thank you.

Operator

This concludes today's conference and you may disconnect your lines at this time. Thank you for your participation.