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Lumentum Operations, LLC 2018 OFC Update, March 13, 2018

## **C O R P O R A T E P A R T I C I P A N T S**

**Chris Coldren**, *Vice President, Strategy and Corporate Development*

**Alan Lowe**, *President and Chief Executive Officer*

## **C O N F E R E N C E C A L L P A R T I C I P A N T S**

**Simon Leopoldo**, *Raymond James & Associates, Inc.*

**Douglas Clark**, *Goldman Sachs*

**Meta Marshall**, *Morgan Stanley*

**James Kisner**, *Loop Capital*

**Joseph Wolf**, *Barclays*

**Tim Savageaux**, *Northland Securities, Inc.*

**Richard Shannon**, *Craig-Hallum Capital Group, LLC*

**Dave Kang**, *B. Riley FBR*

**Kristoff Purchalski**, *Private Investor*

**Tejas Venkatesh**, *USB*

**Rod Hall**, *Goldman Sachs*

## **P R E S E N T A T I O N**

**Chris Coldren:**

Good afternoon. I'm Chris Coldren. I probably know most of you, but if you don't know who I am, I'm responsible for Lumentum's Strategy and Corporate Development. Joining me here up front are Alan Lowe, President and CEO, Aaron Tachibana, CFO, and this is Lumentum's 2018 OFC Update. OFC is the preeminent optical communications conference tradeshow. We hold this event generally every year given this conference and tradeshow is a focal point for the industry, a lot of interesting market and technological trends are discussed at the trade show. Some of these trends are relevant to investors, so we take this opportunity to give you folks access to the Lumentum team and to talk about what's going on in the market.

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We don't have a fixed agenda or presentation this afternoon. The format is going to be purely question-and-answer. We'd allocate 45 minutes for Q&A. That'll give us and you time to get to your next meeting.

With yesterday's announcement that we entered into an agreement to acquire Oclaro, we're sure there's going to be a lot of questions about that pending transaction, but I'd note until that transaction closes, it's business as usual at Lumentum and Oclaro, and as such, we hope we get some questions about our ongoing business as well.

On that front, today we announced a couple of interesting products, 100-gig single lambda transceiver, 400-gig transceiver live demo in our booth. It's up and running, real transceiver products. I was out there checking it out this morning. It's pretty cool. Big crowd huddled around it, so you'll have to fight your way to the front to check it out. The booth also has a lot of other interesting products—next-generation of ROADMs. I'm sure you can hit up some of our product management people and they'll talk your ear off on what we are doing on the ROADM front.

With that said, please note today's meeting is being webcast and recorded for future replay. Once posted, the webcast will be available on our Investor Relations website.

With that said, I need to make the following complicated remarks. This meeting will include forward-looking statements, including statements regarding our expectations regarding the recently announced acquisition, including expected synergies, financial and operating results, and expectations regarding accretion, time to closing, strategies of the combined company, benefit to customers, and the markets in which we operate. These statements are subject to risks and uncertainties that could cause actual results to differ materially from our current expectations. We encourage you to review Lumentum and Oclaro's most recent filings with the SEC, including Lumentum's Quarterly Report on Form 10-Q for the quarter ended December 30, 2017, which was filed with the SEC on February 6, 2018, and Oclaro's Quarterly Report on form 10-Q for the quarter ended December 30, 2017, which was filed with the SEC on February 8, 2018, and those in the S-4 to be filed by Lumentum with the SEC at a future date, and in documents which are incorporated by reference therein. The forward-looking statements we provide during this call, including projections for future performance, are based on our reasonable beliefs and expectations as of today. Each of Lumentum and Oclaro undertake no obligation to update these statements except as required by applicable law.

Now, with that said, we can get along with our Q&A session. I might ask, as you raise your hand and ask a question, please identify yourself by name and the firm that you're representing. Who's up to bat first? Yes, Simon?

**Simon Leopold:**

Thank you. Simon Leopold with Raymond James. Why don't we start out with a 3D question? I wanted to see if we can get your perspectives on two aspects. One is you talked about some initial orders for non-iPhone opportunities, so presumably Android. I'd like to get some thoughts about how you see the 3D market evolving beyond the initial customer. Then the second part of the 3D question is you've talked about non-VCSEL opportunities through edge-emitting, and I think that was part of the rationale behind the planned acquisition. Could you talk a little bit about what needs to happen in terms of the technology, whether it's applications or capacity in terms of evolving beyond VCSELS for 3D? Thank you.

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**Alan Lowe:**

Sure. Thanks, Simon. Yes. We had, in our last earnings call, indicated that we had low single-digit millions of dollar orders for Android applications using edge-emitters, and we're ramping production of that as we speak. Again, small relative to what we produced in the second half of '17, but a start with respect to a new technology, a new customer, and diversifying our customer base beyond our initial customers. That's pretty exciting.

I'd say that between VCSELs and non-VCSELs, it's still a mix going forward and I think as we introduce new products and make new announcements there'll be Android customers that use edge-emitters and there'll be Android customers that use VCSELs, and some perhaps could use one of each, given the different applications for the separate devices. So, I think at this point in time we're looking forward to the ramp in the second half of this calendar year for our existing customer, as well as layering in additional customers in the Android space using both edge-emitters and VCSELs. So, we are winning business with new customers with both technologies and my hope is that as different customers introduce different models at different times throughout the year, we smooth out that up and down that we saw second half versus first half of the calendar year because some customers will be introducing products in the early part of the calendar year in '19 and I think that'll help us smooth that revenue flow and keep the sustainable performance of our business.

**Douglas Clark:**

Thanks. It's Doug Clark from Goldman Sachs. A question following up from yesterday's discussion, so it's on Oclaro. The first one, can you articulate in a little bit more detail kind of the cost synergies, the \$60 million, kind of specific initiatives or areas where that can come out? Then another question. On the revenue side you talked a lot about the complementary nature of the customer and product base. Are there any overlapping kind of solution sales that could result in revenue dis-synergies?

**Alan Lowe:**

Yes. We can't be specific with respect to the synergies and where they're going to come from. What we did say was that we expect about \$60 million of synergies that will be able to be realized between 12 and 24 months after the close of the transaction. If you look at the longer-term business model, you can see where most of it is going to come out of. We'll have both a mix of improved synergies from within COGS, as well as within SG&A, as you would expect. Our focus is not to take costs out of R&D, frankly, but to accelerate our roadmap and bring our new products to market faster and really provide our customers with the differentiated products to help them win.

Revenue dis-synergies?

**Chris Coldren:**

Yes. I mean, I think that would involve going into product line level details that we don't disclose generally, but in going into this transaction, obviously, if we had concerns about that, that would weigh into our logic and the transaction, and if we announce something it's not overly concerning to us.

**Meta Marshall:**

Meta Marshall, Morgan Stanley. I guess I'll just ask the China question of where you're seeing pockets of demand, how you expect demand to develop throughout the year.

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**Alan Lowe:**

Sure. I view China as a market with different aspects with respect to different product lines. As we went through the steep ramp in 2016 and the slowdown in 2017, we saw the slowdown in 2017 coming from mostly our coherent components. The transport side of our business maintained a pretty strong demand throughout '17 and into what we're seeing today, and those products were things like pumps for amplifiers, ROADMs, as we start seeing additional demand for ROADMs for both importing into China and then them exporting them, but also I'm still a firm believer that we're going to see major deployments within China later this calendar year and into '19 when more than one carrier will be deploying ROADMs. For us, I think that the inventory of coherent components is going into the network equipment manufacturers slower than it is going out, so inventories are coming down, but I'd say that they're not to the level yet where inventory in is the same as inventory out, and I expect that to happen sometime this year, but I don't have a crystal ball to say when that's going to happen. I do think that I'm very bullish with respect to overall demand for our ROADMs and pump lasers in China and I wish I had more capacity today to be able to satisfy some of that demand on ROADMs.

**Simon Leopold:**

Thanks. Simon Leopold, Raymond James again. Pivoting on the ROADM market, Finisar announced that they were giving up pursuing an opportunity that presumably is the Verizon opportunity that you've largely dominated. So, where you believe Nistica is selling into that market, but what do you see is the implications for you in terms of Finisar's moving away from the ROADM? Do you see that as an opportunity that gets larger than simply backing away Verizon? Do think it opens up more doors for your ROADM business? Thanks.

**Alan Lowe:**

Sure. Thanks, Simon. I think we've had a very strong ROADM line card business, and, in fact, amplifier line card business over this past several years and I think we're going to continue to see very strong growth moving forward. We have a very large funnel of product designs come in. If you go to the booth you'll see a lot of the new ROADMs we have that we are doing ROADM modules, as well as ROADM line cards using those new modules. So, it's pretty exciting.

I don't know that the announcement that one of our competitors had that says they're going to stop is going to change anything, frankly, because they didn't ever get qualified. So, I think from that perspective it's business as usual.

We have an extremely tight relationship with the customers that are designing line cards and that trust and partnership that we have with those customers is going to continue and, in fact, we'll probably grow with respect to new customers doing line cards and with the knowledge that we have and the engineering resources that we have, I think we're going to continue to have more and more revenue from ROADM line cards.

**James Kisner:**

Hi there. James Kisner, Loop Capital. I was just curious. There's been a lot of talk at the tradeshow and yesterday at the executive forum about the increasing need to integrate optics and silicon like coherent DSPs. Obviously you guys have a project with one of your major customers, you know, to do modules down the road. But I'm just wondering Ford made a pretty strong statement that he wasn't sure that these capabilities belong under the same roof, just given different business models. I just want to get your thoughts philosophically and whether you think maybe down the



road it might make sense to, say, have a coherent DSP in-house. Thanks.

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**Alan Lowe:**

Yes. That's a good question. I think regardless if you have it in-house or not, I think you need to have a partnership at a minimum with one or more DSP suppliers, both on the coherent side, as well as on the datacom side. The PAM-4 is a DSP and we have partnerships today with those suppliers, several of those. I think going forward we will have partnerships with the coherent DSP suppliers. I think step one is certainly to have those partnerships.

Whether that leads to something down the road, I don't know and hard for me to speculate, but I'd say that there are opportunities, and as we get into DCOs to have a need to have a DSP so I think our focus is enabling people to make DCOs and selling the components to that, as well as have a roadmap that includes partnering with DSP suppliers to make our own DCOs.

In effect, if you look at our partnership we have with Ciena on their DSP and their coherent module, that's an example of what I'm talking about.

**Joseph Wolf:**

Thanks. Joseph Wolf from Barclays. Just back to 3D, you talked about multiple applications, multiple end markets, but can you address whether you're going to see any revenue or where the market outside of the handset market would be, and what's most interesting in terms of where that's going? Is it automotive or is there something that we're not thinking about which could be very interesting?

**Alan Lowe:**

Well, I think, historically, if you go back in time, we start with the 3D sensing business in gaming with two generations of Microsoft. Then the next generation was for mobile computing, Intel's RealSense. I think that we're going to continue to see more of that, but handsets certainly towards the volumes of those other applications to date. I think we'll start seeing tablets and other mobile devices incorporate similar interfaces that you see on the handsets. Then I think you'll see things, or you are seeing things like the latest Amazon Look, as well as drones and other applications. We're investing today working with automobile manufacturers, as well as tier-1 suppliers to the automobiles about in-cabin 3D sensing, as well as for LIDAR, both mid-range and long-range LIDAR, but I wouldn't count on a tremendous amount of revenue for that for several years. It's a long-term investment that we're making today that I think in 2021, 2022 that becomes a more meaningful part of our business. But you have to invest today to be able to be ready for two or three or four years out in that market, so we are making those investments.

**Tim Savageaux:**

Hi. It's Tim Savageaux over at Northland. Chris, you mentioned the 400-gig demo in the show floor. There's quite a few of those out there today. I wonder if you'd comment on kind of your expectations for timing of a ramp there from whatever form factor you care and you guys might be the only ones with both on the floor actually; I'm not sure but when you expect that to ramp and how you look at differentiation in that market and maybe how that speaks to your overall strategy on the datacom side as well at 100-gig.

**Chris Coldren:**

Yes. From a timing standpoint, we believe, at least the 400-gig products we're focused on which generally will be used in the cloud space, initially, we're probably mid- to late-2019 in reality. It's not just timing on our part. You're playing into availability of switching silicon switches, etc., the whole ecosystem has to come together, but current thinking is it would be a ramp in 2019 second half and going into 2020 more substantially.

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From a differentiation standpoint, the architecture of the 400-gig transceivers in question is similar in nature, a 4 wavelength device or 4 wavelength device similar to today's CWDM4 transceivers, but the speed turned up, the modulation format advanced going from a simple on/off to a PAM-4 modulation. So, you need to have expertise in being able to make your laser transmitter go now at 56G and you need to be able to have PAM-4. Neither of those are trivial technologies, and marrying the two is not trivial either. As such, we've developed partnerships with the DSP and 4-DSP vendors, as well as with customers to be able to bring those solutions to market.

While I think there's some folks demonstrating not as many that are demonstrating actual transmission real product, etc., it's pretty darn tough and that's, I think, an exciting attribute that today's 100-gig transceivers are really leveraging a 10-gig solution kind of just turned up a little, whereas going to the 56G and the PAM-4 is a pretty big leap across multiple places. I mean, even things that you would think of as simple making a print circuit board ended up being extremely complicated at those kinds of speeds and we think that that's going to focus the customer base on folks that have that capability.

Now, to your point about the acquisition announced, I think the acquisition is consistent with this strategy of focusing on very high performance photonic devices, making sure that we've got the world's best lasers, world's best EMLs, and, openly Oclaro has talked about at a 100-gig moving a lot of their business to chip sales. We're of the same mindset that over time you can imagine introducing products that are very complicated as a module where there's a lot of value created in that module integration, but eventually that value from the chip upwards may be degrading over time, but ultimately that base fundamental semiconductor value will persist given the technical complexity, both from a design and a fabrication standpoint.

**Male Speaker:**

Alan, I wanted to ask you a question on a comment you made yesterday about the tail-end of '17. You shipped more VCSEL lasers in the month of November and December than you have throughout the history of VCSEL lasers. First of all, I just want to make sure you're referring to elements or, you know, because in a 2D array there is over 300 elements. What was the reference point? Two, do you think there is a fundamental shift in the industry towards more consumption of lasers? Is there something different driving the fundamental business going forward?

**Alan Lowe:**

Before you give the back mic, on the second question, specific to what kind of lasers you were talking about?

**Male Speaker:**

VCSELS.

**Alan Lowe:**

Okay. Yes. I think to clarify, what we said was and I was echoing our product line manager from the prior session that said that in November and December the shipments from Lumentum of VCSELS was more than the history of the industry from the start of time. I believe that's the VCSEL emitters, so you're right, as you have an array of about 300 emitters in it, it's basically 300 VCSEL, but still we shipped a lot. The second question?

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**Chris Coldren:**

You mean a shift in our business?

**Male Speaker:**

Yes. Do you see a more consumption of lasers? Are we entering a new phase in where applications are going to be demanding more lasers? Are we going to see more of these 2D or 300 element type applications?

**Alan Lowe:**

Yes. I think customers that use VCSELs in their 3D sensing applications will have arrays of VCSELs, but if they choose to use an edge-emitter, it will have one laser in it. If you take a VCSEL, and for some customers you have 300 emitters, they make 30,000 dots out of that and so they put the VCSEL light through a Diffractive Optical Element, or a DOE, to replicate that pattern. You need to do the similar kind of thing with an edge-emitter, but you have one laser that then you put into 30,000 dots or pixels, if you will. So I think it's going to depend on what that customer chooses from a technology standpoint and then how they use it.

As we look forward, we believe that the front-facing 3D sensing cameras will be both VCSELs and edge-emitters. The rear-facing or world-facing 3D sensors where we'll get into more applications and more virtual reality, more different kind of fun things, we'll see a mix of different types of lasers as well. But I think going forward we are imagining more content per mobile device and more customers that are going to be implementing these types of products going forward.

**Richard Shannon:**

Richard Shannon, Craig-Hallum. Question on 3D sensing as well. How should we think about how you view your share within 3D sensing and I guess maybe looking in kind of the second year of your opportunity here which kind of overlaps with your fiscal '19? Can you answer that in terms of are the characteristics here whether competitors have capacity or working products or any other characteristics that will determine that, if you could, please?

**Alan Lowe:**

Yes. I'd say that we had a pretty good share in the second half of '17, obviously, and I think our focus has been continuing to keep the mind share of the engineers for next-generation of products, as well as for additional customers as opposed to working on ramping last-generation of products. Our focus is continuing to maintain a high share of business and ensuring that we have the capability of enough engineers working on the next-generation of products so that as we introduce new products and later this year, as well as into calendar '19, that we get that lion's share of that initial ramp. So, I'm pretty confident and comfortable with the share that we're going to get in the second half of calendar '18 and the investments we made a year ago and this year in new product designs is going to really dictate the share that we get in calendar '19. So, I'm pretty comfortable with where we are. I mean, of course, our customers want lower prices and they want flexibility, and so we're not going to maintain the kind of share that we had, but we're certainly going to do our best to try to keep it.

**Dave Kang:**

Dave Kang, B. Riley FBR. Two questions. First, regarding 3Ds versus VCSELs versus edge-emitters, what do you think the mix will be in the next two to three years? The second question is where are you in terms of VCSELs or edge-emitters for rear-facing camera and what do you think the dollar content will be for that?

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**Alan Lowe:**

Okay. Mix between edge-emitters and VCSELs? I mean, I think a year, two years from now we'll still be more VCSELs than edge-emitters because I think we're seeing Android market may be split. There are a few big Android suppliers that will be VCSELs and some that will be edge-emitters. I think it also depends on how deep in their product line they go. I would expect that initially in the products that rollout in the second half of '18 and into the early part of '19 will be high-end models and then proliferate down through the product lines. That's on the edge-emitter versus VCSEL.

Front-facing, we like to call it world-facing. We have been working on those products for probably a year-and-a-half now already. We expect to have world-facing 3D sensing capability in mobile devices that are introduced in the middle part of calendar '19. I guess the point of that is it takes two years to design something new and we've made those investments, so we feel, again, comfortable and confident that we will be the lead guy, lead supplier for those customers that are making investments in new generation of applications of 3D sensing and new types of devices.

I would also say that the world-facing products that we're working on are different. There's more complexity, there's higher levels of tests that need it because you have a higher power laser, so there's a lot of testing that you have to do to make sure that they're eye-safe, for instance. Those investments that we're doing today for products that we're going to introduce in 15 months or more from now, and the learning that we've had as we went through the first ramp, will really position us well for those world-facing cameras.

As far as the ASPs, ASPs are really a function of chip size and so while I think we'll probably have a slightly higher ASP for world-facing, it's not radically different.

**Kristoff Purchalski:**

Kristoff Purchalski, Private Investor. Regarding 2D sensing, it seems that the last model for the phone with 2D sensing sold not as much as many of us hoped it would. Has that changed the enthusiasm for 3D sensing in Android phones and has that changed your clients' projections as to numbers and so on?

**Alan Lowe:**

Yes. I can't comment on our clients' projections for how well they're going to introduce new products and I can't even comment on whether it was higher or lower than their expectations, but I think the press has done a good job of making some projections. I'd say that from my perspective it has not dampened the enthusiasm of the Android makers. In fact, I'd say that they're scrambling and they were waiting to see if it was going to be an interesting or differentiated application and I'd say it is. I'd say also that I don't think that our customers are going to stand still and not add applications or use cases for these devices, and especially as we get into the world-facing side, I think you'll see a lot more applications that differentiate one handset from another, and I think people are going to scramble to chase there as well.

**Chris Coldren:**

Yes. I'd like to add to that that I think you have to separate maybe I mean, this is a feature of a phone and I would say that at least our view is that that feature has received very favorable feedback. It works. It works quite well. People are happy with it, and as such we're seeing customers believe they need to have that either functionality in their first



phones or spread to other models and, therefore, I think it's difficult to say that that feature was it was quality or desirability of it that was correlated with the number of any particular customer's unit sales.

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**Douglas Clark:**

Hi. It's Doug Clark again from Goldman. I have a question on datacom, just broadly. The industry's facing competitive pressures right now as it relates to ASPs and volume supply overall. Do you think that there's a different structural kind of economics scenario on the datacom side of the business than on telecom? It kind of goes, Chris, to your comments a little bit on the next form factor of QSFP-DD and OSFP. Do you think that those can help correct some of the pricing challenges that the industry is facing?

**Alan Lowe:**

Well, I don't know that we'll ever correct the expectation of our customers to have lower prices. I think as we look at the datacom business we look at it as the client's side of telecom networks and that has a more stringent reliability, more stringent type of design that really requires you to have high intellectual property in those products. I think that's going to continue to be a good business for the industry.

I'd say that the challenge that we as an industry have is that the purchasing power of the hyperscale data center guys is so big that they demand very aggressive prices. We're in the process of developing a next-generation 100-gig product where we really focused only on cost. It is all about cost and simplification of the product, and as opposed to our last generation of hyperscale datacom products was like a cost reduction of the client-side telecom products, so gold boxes for medic seals, things like that that add costs that are definitely needed on the client side of telecom but are overkill for the hyperscale. So, we'll be introducing in later part of this year a very, very low-cost CWM product that we'll be able to address the requirements of the hyperscale data center and have good enough performance, frankly, for what they are asking for. They're still going to want lower prices.

**Male Speaker:**

We might be the only people who don't want lower prices. On the world-facing 3D sensor, I realize this depends on how customers implement it and lots of other things, but can you give us any idea what the effective range of that will be as we try to think about what applications it might enable? Are we talking 10 feet or 15 feet or 30 feet?

**Chris Coldren:**

Well, I would say the best way to answer that question is our customers don't necessarily tell us precisely that. They provide a specification to us on laser output power, laser output beam shape, which then depending on the optics that they put after the laser would dictate the performance range. With that said, I think you're talking about the right kind of distances. We're not talking about things that are 50 meters off. You're talking about across the room or something that's in front of you, if you will. It's certainly based on the specifications of the products that we developed two years ago that went into this last year's ramp. You can kind of think of them as an arm's length type specification that the way we have to test it, and we have to test it for multiples of that distance for what we're calling world-facing devices.

**Tejas Venkatesh:**

Tejas Venkatesh, UBS. A couple of quick questions. How do you justify what you're paying for Oclaro? Then I want to get your thoughts on silicon photonics.

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**Alan Lowe:**

Okay. I would say that in terms of what we are paying, as we went through analysis of relative accretion, dilution, various other valuation metrics, and then incorporating the synergy opportunity we have for the acquisition, I think fairly standard practices have come out with how you value a company and any valuation is like a little mini marketplace. There is a bid and ask and you eventually resolve that at a particular level.

What was the second piece of the question? Our comment about silicon photonics on our call yesterday really underscores that as we went into an extensive review of inorganic options for us and ways to accelerate our business plans, we're not necessarily married to any particular technology. We're not zealous for a particular technology. We want to figure out what's the most effective that'll make our customers desire the products that we make. We did definitely look at numerous opportunities in the silicon photonic space and said, "Hey, could they deliver what we need in future 400-gig terabit-plus modules?" and our conclusion of that work was there may be places where it plays well, but indium phosphide devices have superior performance in many, many areas and we have a lot of expertise in that and, therefore, that's probably a best place to place our investment over the long run.

I think it's not too different than when you think about what goes on in the RF electronics world where the gallium arsenide and indium phosphide materials are continually pushing the envelope performance and then eventually silicon devices may catch up from a performance perspective, but the indium phosphide and gallium arsenide devices continue to push the envelope.

Well, a quiet group.

**Rod Hall:**

Hi. Rod Hall with Goldman Sachs. Wouldn't want you to have to end early, Chris. Just a question I got for edge-emitter versus VCSEL in terms of marginal demand. Is there any shift one way or the other in the Android community toward VCSEL or back toward edge-emitter solutions? Can you give us any color on if there is any movement, why that would be happening?

**Chris Coldren:**

Changes of decisions or shift in demand between customers for VCSELs or edge-emitters in the Android world, I think there is no let me slow down and think. Folks generally are in one camp or the other from a customer perspective in that they've this isn't necessarily new to them. Most of customers that we're talking about, even that are still almost a year away, let's say, from a product launch or a little less than a year; have been using edge-emitters and VCSELs in their development and each of them thinks they've got an angle to make a better product using one technology or the other. As Alan highlighted, there are, in most applications, two devices being used, two laser devices. They have fairly different performance, so I would say with one of the devices there's probably somewhat high probability they're going to go with a VCSEL. It's a simpler device with less challenging performance requirements. Then when we look to the second laser device, that's where there's a much more bifurcated market.

The edge-emitter device gives customers some unique performance attributes with regard to power efficiency, as well as, as Alan alluded to, the way this imaging physics works is illuminating with tens of thousands of points or dots, and how you generate that pattern of light is very critical to the performance of and resolution of that image. Each customer has their own sort of proprietary pattern that they believe gives them an advantage, and, therefore, that

pattern is essentially their intellectual property. That pattern is generated either via the laser and well, the laser and the combination of that Diffractive Optical Element. There are customers that say, "Hey, I want to keep that all to myself and I'll do it in a Diffractive Optical Element, and then I want a single laser with the best performance, highest efficiency, highest output power, and that tends to be an edge-emitter. There're other customers that say, "Hey, I'll use a simpler Diffractive Optical Element and I'll use the VCSEL array. So it's that balance between where do they want to put the intellectual property, if you will, in the design.

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Lumentum Operations, LLC 2018 OFC Update, March 13, 2018

**Rod Hall:**

To avoid running into I mean I understood a while ago this might be dated that there were some issues with Apple's intellectual property there. I'm wondering did you guys lose any production scale? Do you have to produce VCSELs with certain patterns for certain Android community members that would be significantly different from the ones you would make for Apple?

**Chris Coldren:**

I would say that every customer is asking for something unique, so there is not an off-the-shelf product. With that said, the VCSELs we make are kind of built on a platform, so the different devices we make for different customers are not radically different in design or supply chain on the VCSEL front. Really, the only bifurcation is in VCSEL versus edge-emitter.

**Alan Lowe:**

There's also, for VCSELs there could be a larger chip or a smaller chip or a different pattern of that layout of the array and so I don't think there's anything that we'd lose capacity because of something someone did other than the size of the chip. Maybe you get a certain number of die per 6-inch wafer, and if it's a bigger chip then you get fewer die and higher cost, higher price as well.

**Dave Kang:**

Dave Kang, B. Riley FBR. I'm hearing AT&T, they're Open ROADM. I guess they're moving from trial to implement phase. What does that mean for your ROADM business? Could it be as big as the Verizon opportunity?

**Chris Coldren:**

Well, certainly AT&T is a very large network operator in the world and if they were to do an analogous to what Verizon is doing with more of a greenfield-type upgrade, that would be massive for us. With that said, I think it's not like that end customer is not deploying ROADMs already, and they have network deployments underway, so it's not going from zero to something; it's already underway. I think the good news about what they're pursuing is really lowering the barrier, at least in their perspective, lowering the barrier for ROADM networks to be deployed in their own network, but AT&T is not the only member of Open ROADM.

Where we sit on the supply chain, we're largely agnostic because we supply a component and what they're trying to push is making the software that sits on top of operating a ROADM to be much less proprietary and more open source so that ROADM, as a component level that we supply to one of our customers, if we supply that same component to another customer, that they should be able to work together as opposed to software blocking those products working together. That's really their focus. From our standpoint, it lowers the barrier for more mass deployment of ROADMs in that initiative.

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**Meta Marshall:**

Just a follow-up question. You mentioned on the call last night, or yesterday, having constrained engineering resources. Just getting an idea of how quickly are you able to kind of move some of these engineers from kind of one product development to another product development? Is that something that they can kind of move to different projects immediately or it takes 6 to 12 months to kind of get them ramped in the areas where you want to focus them?

**Alan Lowe:**

Well, I mean, we move engineers from project to project all the time and we're going to continue to do that as a standalone business, regardless of the closing time of the transaction that we had proposed yesterday. I think as we look at chip designers in the world, there's only a certain number of chip designers. Whether they design a chip that goes into a next-generation coherent component or into a LIDAR chip that goes into next-generation automobiles, they can transition pretty quickly. As we look at the combined engineers between the two companies, 1,300 engineers, we're going to have the ability after close, to figure out what is the best way to optimize those engineers and what's the best way to accelerate our roadmaps to really enable our customers to win. I wouldn't say it's a retraining of any certain time. It depends, though. You can't take a mechanical engineer making transceiver designs and expect them to be able to make chips overnight. So, I'd say if they're similar capabilities, they can move pretty quick.

**Simon Leopold:**

Simon Leopold, Raymond James. Wanted to touch on the industrial commercial laser business because it always seems to be overlooked. The general thinking is the improved macro-environment should make that a better business, but maybe if you could talk a little bit more deeply about product cycles, particular opportunities, and how would you think about that business in the balance of calendar '18? Thanks.

**Alan Lowe:**

Sure. We view our commercial lasers business in two markets. One is micro machining, so this is nanosecond, picosecond type lasers for micro-machining materials, whether that be semiconductors, printed circuit boards, flex circuits, things like that. The miniaturization of consumer electronics has driven more smaller, more precision type of devices. Take, for instance, mobile handsets. The number of flex circuits in a mobile handset compared to three years ago is about double. That drives the need for more precision, more laser processing and the number is higher. So, we're seeing a very large demand on those products and we expect growth throughout the calendar year on our micro-machining business.

On the macro-machining business, which had been predominantly our fiber lasers for Amada, we introduced our Gen 3 product. It is now very stable and running very solidly in our factory and within Amada. Now we're trying to catch up with the demand, so we're expecting fiber lasers to continue to grow throughout the calendar year. Then as we add customers, once we take care of Amada, as we add different customers, we expect that business to have a long-term growth trajectory. We just haven't been able to get out into other customers because of satisfying Amada, not having the right cost structure to have a total overall turnkey fiber laser. Now we're to that point with this Gen 3 product to have a good cost to be able to penetrate the market outside of Amada, once we satisfy their demand.

**Chris Coldren:**



Okay. Let's do one more question and then we'll wrap up here.

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Lumentum Operations, LLC 2018 OFC Update, March 13, 2018

**Male Speaker:**

Thanks for fitting us in. Can you just help us think about your VCSEL cost structure? I guess in light of one of your biggest competitors ramping, like, a new six-inch fab. I guess they think they probably could get a cost advantage versus the margin stacking in the supply chain that you have in the outsource model, and then maybe just how we think about the operating margin trajectory of this 3D sensing VCSEL business?

**Alan Lowe:**

Yes. I'd say that vertical integration is interesting, although when we made the decision to partner with the two partners that we did for our current 3D sensing, it was really based on their existing capability, high-volume boundary model, a lot like semiconductor. So I would put that cost structure even with margin stacking up against any new fab for several years because they have years of experience of building thousands of wafers per week; the yields are extremely high, way higher than we're doing internally in our own existing fabs, making indium phosphide and gallium arsenide. I would put our cost structure up against any vertically integrated operation for quite some time. We're going to continue to partner with these partners as long as they continue to get yield improvements and cost reductions, and we're very happy with where we are, and so I'm not as concerned about people building new fabs and coming up to speed overnight with better cost structure.

As far as operating margins, you saw the incremental revenue in the December quarter and what it's led to in an operating margin perspective. I think we expect it to obviously be above our corporate average operating margin and gross margin, and we expect that to continue throughout the next several years.

**Chris Coldren:**

All right. Well, thank you everyone for joining us. Hope to talk to you soon.

**Cautionary Note Regarding Forward-Looking Statements**

This communication contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. Forward-looking statements generally relate to future events or our future financial or operating performance. In some cases, you can identify forward-looking statements because they contain words such as may, will, should, expects, plans, anticipates, could, intends, target, contemplates, believes, estimates, predicts, potential or continue or the negative of these words or other similar words or expressions that concern Lumentum's expectations, strategy, plans or intentions. Lumentum's expectations and beliefs regarding these matters may not materialize, and actual results in future periods are subject to risks and uncertainties that could cause actual results to differ materially from those projected, including but not limited to: the risk that the transaction does not close, due to the failure of one or more conditions to closing or the failure of the businesses (including personnel) to be integrated successfully after closing; the risk that synergies and non-GAAP earnings accretion will not be realized or realized to the extent anticipated; uncertainty as to the market value of the Lumentum merger consideration to be paid in the merger; the risk that required governmental or Oclaro stockholder approvals of the merger (including U.S. or China antitrust approvals) will not be obtained or that such approvals will be delayed beyond current expectations; the risk that following this transaction, Lumentum's financing or operating strategies will not be successful; litigation in respect of either company or the merger; and disruption from the merger making it more difficult to maintain customer, supplier, key personnel and other strategic relationships.

The forward-looking statements contained in this communication are also subject to other risks and uncertainties, including those more fully described under the caption **Risk Factors** and elsewhere in our filings with the Securities and Exchange Commission ( SEC ), including our Annual Report on Form 10-K

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for the year ended July 1, 2017, which was filed with the SEC on August 29, 2017, our Quarterly Report on Form 10-Q for the quarter ended December 30, 2017, which was filed with the SEC on February 6, 2018 and those discussed under the caption "Risk Factors" in the S-4 to be filed by Lumentum with the SEC at a future date in connection with this transaction and in the documents which are incorporated by reference therein. The forward-looking statements in this communication are based on information available to Lumentum as of the date hereof, and Lumentum disclaims any obligation to update any forward-looking statements, except as required by law.

### **Additional Information and Where to Find It**

This communication is being made in respect of a proposed business combination involving Lumentum Holdings Inc. and Oclaro, Inc. In connection with the proposed transaction, Lumentum will file with the SEC a Registration Statement on Form S-4 that includes the preliminary proxy statement of Oclaro and that will also constitute a prospectus of Lumentum. The information in the preliminary proxy statement/prospectus is not complete and may be changed. Lumentum may not sell the common stock referenced in the proxy statement/prospectus until the Registration Statement on Form S-4 filed with the SEC becomes effective. The preliminary proxy statement/prospectus and this communication are not offers to sell Lumentum securities, are not soliciting an offer to buy Lumentum securities in any state where the offer and sale is not permitted and are not a solicitation of any vote or approval. The definitive proxy statement/prospectus will be mailed to stockholders of Oclaro.

**LUMENTUM AND OCLARO URGE INVESTORS AND SECURITY HOLDERS TO READ THE DEFINITIVE PROXY STATEMENT/PROSPECTUS AND OTHER DOCUMENTS FILED WITH THE SEC CAREFULLY AND IN THEIR ENTIRETY WHEN THEY BECOME AVAILABLE BECAUSE THEY WILL CONTAIN IMPORTANT INFORMATION ABOUT THE PROPOSED TRANSACTION.**

Investors and security holders will be able to obtain these materials (when they are available) and other documents filed with the SEC free of charge at the SEC's website, [www.sec.gov](http://www.sec.gov). Copies of documents filed with the SEC by Lumentum (when they become available) may be obtained free of charge on Lumentum's website at [www.lumentum.com](http://www.lumentum.com) or by directing a written request to Lumentum Holdings Inc., Investor Relations, 400 North McCarthy Boulevard, Milpitas, CA 95035. Copies of documents filed with the SEC by Oclaro (when they become available) may be obtained free of charge on Oclaro's website at [www.oclaro.com](http://www.oclaro.com) or by directing a written request to Oclaro, Inc. Investor Relations, 225 Charcot Avenue, San Jose, CA 95131.

### **Participants in the Merger Solicitation**

Each of Lumentum Holdings Inc., Oclaro, Inc. and their respective directors, executive officers and certain other members of management and employees may be deemed to be participants in the solicitation of proxies in respect of the proposed transaction. Information regarding these persons who may, under the rules of the SEC, be considered participants in the solicitation of Oclaro stockholders in connection with the proposed transaction is set forth in the proxy statement/prospectus described above filed with the SEC. Additional information regarding Lumentum's executive officers and directors is included in Lumentum's definitive proxy statement, which was filed with the SEC on September 19, 2017. Additional information regarding Oclaro's executive officers and directors is included in Oclaro's definitive proxy statement, which was filed with the SEC on September 27, 2017. You can obtain free copies of these documents using the information in the paragraph immediately above.

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