Company Name: Applied Materials
Company Ticker: AMAT US
Date: 2017-08-17
Event Description: Q3 2017 Earnings Call

Market Cap: 47,703.97
Current PX: 44.73
YTD Change($): +12.46
YTD Change(%): +38.612

Bloomberg Estimates - EPS
Current Quarter: 0.903
Current Year: 3.212
Bloomberg Estimates - Sales
Current Quarter: 3931.375
Current Year: 14483.765

Q3 2017 Earnings Call

Company Participants

- Michael Sullivan
- Gary E. Dickerson
- Robert J. Halliday
- Daniel Durn

Other Participants

- C. J. Muse
- Farhan Ahmad
- Atif Malik
- Harlan Sur
- Krish Sankar
- Toshiya Hari
- Joseph L. Moore
- Romit Shah
- Patrick J Ho
- Y. Edwin Mok
- Weston David Twigg
- Craig A. Ellis
- Jagadish K. Iyer

MANAGEMENT DISCUSSION SECTION

Michael Sullivan

GAAP and Non-GAAP Financial Measures

Today’s call also includes non-GAAP adjusted financial measures

Reconciliations to GAAP measures are contained in today’s earnings press release and in our reconciliation slides, which are available on the Investor Relations page of our website at appliedmaterials.com

Gary E. Dickerson

Q3 Highlights

Earnings and Markets

- With revenue and profits at all-time highs, I'm pleased to report that Applied Materials has now delivered earnings records for the past five quarters
- We have tremendous momentum and a very positive outlook for the future

- Our markets are growing with a broader set of demand drivers

Investments

- Across a wide variety of industries, companies are making huge investments to drive transformative changes that shift economic value towards technology
- At the very foundation of these emerging trends is Applied
  - And we are playing a larger and more valuable role advancing the innovation roadmaps in semiconductor and display

Portfolio of Technologies and Businesses

- Our broad portfolio of technologies and businesses, combined with our strategy and investments, means that Applied has never been in a better position
  - This gives me confidence that we will continue to expand our available opportunity, gain share and outperform our markets
- In today's call, I'll outline key industry trends, as well as our strategy for sustainable profitable growth
- I'll then provide additional details about our markets and major businesses
- Bob will then discuss how we're translating our broad portfolio of capabilities and products into differentiated performance for Applied
- And after that, Dan will provide his initial impressions about our future opportunities, as well as our outlook for the next quarter
- I'll start with a backdrop for today's discussion

Markets

- These are incredibly exciting times for Applied, and I strongly believe that we have more opportunities today than at any point in our history
- There are three main reasons for this
- First, our markets are strong and getting stronger
- Pervasive demand for electronics means that our markets are getting larger and substantially less cyclical
- New demand drivers are emerging that layer on top of traditional computing and mobility
  - The Internet of Things, Big Data and artificial intelligence will transform industries over the coming years

Healthcare, Transportation, Manufacturing and Retail

- In healthcare, transportation, manufacturing and retail, competition is increasingly dependent on capturing, transmitting, understanding and storing data and images
- In these industries and many more, value is shifting towards semiconductors and displays
- To realize the potential of IoT, Big Data and AI, major technology inflections are needed to advance the roadmaps in logic, memory and display

- These inflections are enabled by materials innovation, and as the leader in materials engineering, Applied has a fundamental role to play

Innovation Leadership Strategy

- Second, Applied is better positioned than ever before
- We've aligned the company around our innovation leadership strategy, and we've made significant investments to accelerate R&D
- We have developed a strong portfolio of differentiated products, with more in the pipeline
- It's the company's breadth and depth of products and capabilities that sets us apart from the competition
  - We have, by far, the largest exposure to industry inflections, and we're combining our skill sets in deposition, removal, materials modification, inspection and metrology to deliver innovative new solutions

Sustainable Advantages

- Third, we've built a platform that gives us sustainable advantages over the long term
- We've done this by strengthening our technical and management teams and putting in place a company-wide operating system, the Product Development Engine, that delivers repeatable success
- Across the organization, I see stronger execution
  - Our product success rate is higher, we are transferring new technology to market faster and we're using our breadth more effectively

Inflections and Investments

- I'll now describe the major inflections and investments within our markets
- In memory, near-term market fundamentals remain strong, driven by high-performance storage for data centers and increasing smartphone content to support new features, including 3D cameras
  - We expect healthy investment in memory to continue, as the explosion of data storage requirements created by IoT, Big Data, AI and streaming video has only just begun

3D NAND

- To keep up with demand, customers are aggressively pursuing their 3D NAND scaling roadmap, which has four major levers: increasing number of pairs, shrinking film and stack heights, multi-tier schemes, and lateral scaling
  - All these approaches are enabled by advanced materials engineering and expand Applied's opportunity

Foundry

- In foundry, market dynamics are equally healthy
- In the near term, we see capacity additions at trailing geometries to meet growing demand for sensors and IoT devices, as well as strong investment in the leading edge
- Looking ahead, advances in artificial intelligence are beginning to drive significant architectural changes, and customers are positioning themselves to win the major inflections in high-performance computing

Data Centers, Logic and DRAM

- In data centers designed for AI workloads, we see logic content growing at least twice as fast as memory
  - And as technology complexity increases, capital intensity is also growing about twice the rate of memory
- In foundry, logic and DRAM, dimensional scaling of devices remains a challenge, with two primary areas of focus, resolution and placement accuracy
- New innovations in patterning are becoming increasingly important as customers move to advanced nodes

EUV Lithography

- First, self-aligned multi-patterning techniques, SADP and SAQP, are needed in conjunction with EUV lithography to drive the resolution roadmap
- Regardless of the rate of EUV adoption, we expect our opportunity in traditional multi-patterning to grow
  - Applied has great momentum in this market and has gained 16 points of share since 2012

New Patterning Approaches

- Second, new patterning approaches are being developed to address placement errors
- As devices scale, the accuracy of vertical alignment between interconnect layers has a significant impact on performance and reliability
- Placement errors cannot be addressed by advanced lithography alone and will require materials-enabled solutions
  - Applied has unique technology in this area, and we expect our opportunity to grow significantly over the next several nodes

Wafer Fab Equipment Spending

- Looking at the market as a whole, our outlook is incrementally more positive
- We now believe that wafer fab equipment spending for the CY will be up 20% or more compared to 2016
  - We also expect 2018 spending to be higher than our current estimate for 2017
- And in these forecasts, we made conservative estimates for spending in China
- In addition, within wafer fab equipment, the ongoing shift to materials-enabled solutions in memory and logic opens up new opportunities for Applied
  - We now address 64% of the total market compared to 53% in 2012

Display Market

- Beyond semiconductor, our outlook for the display market has also strengthened
- Display is growing even faster than wafer fab equipment, as customers make multi-year investments to address large inflections in both TV and mobile
- In TV, a major push to new Gen 10.5 substrates is underway

- These huge, 10 square meter substrates are ideally suited for manufacturing larger-format screens, 60 inches and bigger

- We now expect 13 new Gen 10.5 factories to be built over the next several years

Mobile OLED Investment

- At the same time, mobile OLED investment is getting stronger, as customers prepare for broad adoption of OLED in smartphones
  - OLED enables new form factors that result in a larger display area per smartphone, further expanding the overall market

Major Business Groups

Semiconductor Leadership Businesses

- I'll now provide brief updates for our major business groups
- Our semiconductor leadership businesses, where we have strong market share and highly differentiated products, are having an outstanding year, fueled by investment in leading-edge foundry and expanding applications in memory

PVD and CMP Products

- Demand for our PVD and CMP products is especially strong
- We expect the PVD market to grow by around 45% in 2017, as foundry customers adopt new interconnect technology
- And the CMP market is on track to grow 40% this year on top of 40% growth in 2016
  - Our CMP revenues were at an all-time high this quarter and on track to exceed $1B for the FY.

Semiconductor Growth Businesses

CVD Revenues

- In our semiconductor growth businesses, we have great momentum in markets that are growing rapidly
- Over the past several years, we have gained significant market share in both etch and CVD.
  - Our combined etch and CVD revenues are at record levels, and we're in a great position to drive further growth
- Service is an important part of Applied's portfolio that has grown significantly
  - This year we're seeing an acceleration of that growth
- We delivered record performance this quarter
  - And for the year, we expect revenues to be up more than 15% over 2016

Service Solutions

- Demand for our service solutions is driven by our rapidly growing installed base, plus our customers' need to shorten ramp times, improve device performance and yield, and rapidly optimize their factory output and operating costs
    - We are investing to expand the services we offer, and we are confident in our ability to sustain our growth in this business

Display

- In display, as technologies and manufacturing are becoming more complex, Applied is in a unique position to enable the roadmap
    - This year, display revenues are on track to increase more than 50% over 2016
- And based on our strong position, we expect to grow display at least another 30% in 2018

Summary

Before I hand the call over to Bob, I'll quickly summarize

Applied is executing well, setting new records, growing our available market, and gaining market share

I would like to thank our employees for their passion to create value for customers and Applied

- I'm confident that together we will raise the bar further

Applied is in a great position, working at the sweet spot of major trends that will drive tremendous shifts in economic value over the coming years

Finally, our breadth and depth differentiate us from our competitors

We have wider exposure to major industry inflections, and we are bringing together the broadest skill set and technology portfolio to create new solutions for our customers and accelerate innovation

Robert J. Halliday

Financial Highlights

Markets

- Today I'll add my comments about the business environment, describe how our capabilities and products are driving competitive and financial performance, and invite Dan to share his perspective along with our Q4 guidance
- As you contemplate the markets, including record levels of demand for semiconductors and displays, I'd like you to know three things
- First, I feel increasingly confident that our markets are becoming materially and sustainably larger
- Gary explained the big picture, and I'll add some data regarding the near-term environment

Semiconductor

- In semiconductor, two-thirds of NAND demand is driven by smartphones and SSDs
- NAND demand for these devices is projected to grow by more than 40% in 2017 and 2018
- Smartphones and servers drive the majority of the DRAM market, and demand for these devices should be up by 30% or more in both 2017 and 2018

Foundry

- In foundry, our largest customer recently announced that its 7-nanometer tape-out expectations have nearly doubled, and we continue to see new investment at trailing geometries as well
    - So the largest drivers of WFE demand are strong

Display

- In display, OLED is quickly becoming the preferred technology for leading brands, yet the installed capacity supports less than 40% of the smartphone market
- An increasing technical complexity in semi and display gives us a growing opportunity in services
    - In short, I expect sustainable growth for our markets and particularly for Applied

Environment

- Second, Applied is uniquely well positioned in this improving environment, and we're driving growth and competitive performance across our markets
- Applied has incredible breadth, and we're taking advantage of it across our semi and display businesses to help our customers solve their highest-value problems, with solutions based on unique combinations of our technologies
    - The investments we have made in our new product pipeline are already impacting the market

Revenue Growth

- In 2017, we're delivering strong double-digit revenue growth in every semiconductor device type
- We project our share to be up for the sixth year in a row
    - And our share is balanced at greater than 22% across memory, logic, and foundry
- In patterning, we see continued growth and share gains because we're shipping newly designed products that address both line shrinks and edge placement errors
- We've also put our services business on a growth trajectory, adding $1B in annualized revenues since 2013

Growth Engine in Display

- And we've built a unique and more diverse growth engine in display
- In 2012 and 2013, our annual display revenue averaged $657mm
- We expect to deliver a similar amount in the current quarter

- Our display business is also becoming more profitable, and we're now targeting the operating margins in the high 20%
    - So Applied has the broadest capability, largest served market opportunity, and strongest new product pipeline of any company in the industry

Innovation Engine and Operating Discipline

- Third and perhaps best of all, Applied's innovation engine and operating discipline are driving higher profitability
- The value that our technology brings to the industry is increasing, and that's reflected in our gross margin, which has grown by five points over the past five years

Gross Margins and OpEx

- In Q3, our gross margin was the highest in nine years
- At the same time, we remain focused on expense control
- In Q3, our non-GAAP OpEx to sales ratio was 17.9%, on a record low
- As a result, we delivered our first quarter with $1B in operating profit, and we had record cash from operations equal to 36% of revenue

Performance

- Next, I'll comment on our Q3 performance on a y-over-y basis
- We grew company revenue by 33% and non-GAAP gross margin by 2.9 points
- We grew non-GAAP operating profit by 67% and increased non-GAAP operating margins by 5.9 points to a 16-year high of 28.7%
- And we grew non-GAAP EPS by 72% to a record of $0.86 per share

Balance Sheet Items

Turning to the balance sheet

We grew cash and investments to $8.3B, and 40% was onshore

We repurchased 9mm shares of our stock and returned $482mm to shareholders, including dividends

Segment Performance on Y-over-Y Basis

- Turning now to our segment performance on a y-over-y basis
- We grew Semiconductor Systems revenue by 42% to a record $2.5B and grew non-GAAP operating profit dollars to a record of $920mm
- We grew services revenue by 20% to a record $786mm and increased non-GAAP operating profit dollars to a record of $215mm
- We grew display revenue by 31% and increased non-GAAP operating margin by 2.6 points

Summary

In summary, I'm proud of the accomplishments of our teams, and I'm pleased with our top and bottom line growth

Applied's innovation engine is delivering sustainable momentum for profitable growth

Daniel Durn

Q3 Results

Thanks, Bob and Gary and the entire team here at Applied Materials

You've given me a warm welcome and a great introduction to the technologies we're preparing to launch into a growing market for our products

I'm incredibly impressed by the depth of our technical talent

Applied has a world-class team, and I believe we can do anything we set our minds to

New Advances in Technology

- Gary and Bob talked about new advances in technology that are going to make dramatic change to our industries and to our lives
- I saw this unfolding at my previous companies, and I'm excited to be here because these changes are enabled by semiconductors and displays, which begin with what we do at Applied Materials

Leadership Semi Business

- I'll share more of my impressions about Applied at our Analyst Day in New York
- One thing that's already clear to me as a financial person is that Applied has a tremendous portfolio
- The leadership semi business, as Gary talked about, has some of the strongest product positions and profitability I've seen anywhere in this industry

Semiconductor Growth Businesses

- The semiconductor growth businesses Gary mentioned, are dramatically outpacing their markets
- Etch is up 5x over the past five years, growing at 2.5 times the rate of the market, and that's just one example
    - Display is growing faster than semi, and we have technologies in the pipeline that will enable us to grow beyond what we can do in OLED smartphones and LCD TVs

Services AND Portfolio

- And services are a great way to drive growth and diversify the company in areas that are particularly stable and cash-generative
- Applied's portfolio is incredibly valuable
    - I'm excited to be a part of this team, and I'll use all of my energy to help drive Applied's innovation engine and growth

Guidance

Revenues and Gross Margins

- Now I'll provide our fourth quarter guidance
- In Q4, we expect our overall revenue to be in the range of $3.85B to $4B.
  - The midpoint would be up nearly 19% y-over-y
- We expect our Semiconductor Systems revenue to increase by about 14% y-over-y
- We expect services revenue to grow about 17% y-over-y, and display revenue should be up by about 48% y-over-y
- We expect non-GAAP gross margin of about 46%

Operating Expenses and EPS

- Non-GAAP operating expenses should be $685mm, +/- $10mm
- And we expect non-GAAP EPS to be in the range of $0.86 to $0.94, the midpoint of which would be up by 36% y-over-y

Q1

Revenues

- To help you with your models for the CY, I'll share some of our early views on Q1 of FY2018
- We believe Semiconductor Systems revenue in Q1 is likely to be higher sequentially and higher y-over-y, and we believe our display revenue in Q1 is likely to be lower sequentially, but higher y-over-y

Summary

Revenues and EPS

- Now I'll summarize
- By putting the company's guidance and momentum into context, in Q4, we expect the second highest semiconductor equipment revenue in our history, with continued double-digit growth momentum y-over-y
  - We also expect to set new record levels in services, display and for the company as a whole
- We expect record EPS
- We also look forward to another year of growth in 2018 based on strong customer pool across the portfolio as we supply our enabling technologies to drive the new data economy

QUESTION AND ANSWER SECTION

<Q - C. J. Muse>: The biggest question here is sustainability in memory. And it looks like you're guiding WFE around $43B +/- this year. And roughly 70% of that looks like it's coming from NAND. And so curious, as you look at that part of the market, can you talk to your visibility to both greenfield and shrink plants as well as your thoughts around demand elasticity and how you're thinking about spend from that business over the next five-plus years? Thank you.

<A - Robert J. Halliday>: Overall, we expect WFE in 2018 – I'll drill into the memory too. We expect overall WFE in 2018 to be up from 2017. By device type, we think the logic and DRAM should be higher next year. And we think foundry and NAND should both be strong next year.

I think the 70% of total spend, the NAND, I thought you said C.J., sounds a little high because we have NAND at less than 50% of total spend. But I'll drill into it, a bit deeper dive on what's going on in the memory markets. So let me talk about DRAM and NAND together and I'll drill into NAND also. I think there are three important things to remember about how customers went about Applied in both NAND and DRAM.

One, if you look at NAND and DRAM customers, very profitable now, and I'll give you the numbers. Two, second thing to remember is, demand is strong for both DRAM and NAND. It looks sustainable. The third thing is, actual wafer start additions have been modest, and I'll give you the numbers. And then finally, think about – remember about Applied Materials, we've gained 8 points of WFE share in both DRAM and NAND over the last four years.

So let me give you more specifics. In terms of customer profitability, which was the first talking point I made, DRAM WFE spending as a percentage of total EBITDA for our customers used to be about 26% on average. That's DRAM WFE spending as a part of their total EBITDA. And then we think that's going to go down about half, 14% this year and next. You know they're very profitable. When you look at the numbers, it's very profitable.

The NAND similarly has gone down, it used to be about 26%. We think it's at about a third this year and next to 19%. But that's also sustaining more higher growth rates in NAND. The second thing to remember is bit demand. So if you look for smartphones and servers in both 2017 and 2018, we see 30% bit growth demand. Now it goes down a point or two when you layer in PCs and stuff, but the big drivers are smartphones and servers, and we see 30% bit growth demand or gigabytes.

Secondly, in NAND bit demand, we see 40% growth rate in 2017 and 2018 each for smartphones and solid-state disk drives. Then on capacity additions, if you go look at the data over the last – basically, five years and we see this year basically the same, NAND – DRAM wafer capacity has been basically flat. They've got some bit growth but because of their more layers, the actual wafers out of the building goes down. So it's flat, not a lot of capacity added.

Then, if you look at NAND capacity additions, they've spent a lot of money, but the actual capacity additions have been somewhat modest, a couple of hundred thousand wafer starts up to 1.6mm now. And we project that they need about 2B in a few years – 2mm wafer starts from – 2B a couple years after that.

But if you look at the three big things, customers are very profitable in both DRAM and NAND. Secondly, bit growth and bit demand – bit demand is still very healthy, and we see it next year, too. And three, actual wafer capacity additions have been moderate. So we think – I think NAND's pretty good for the foreseeable future.

<Q - Farhan Ahmad>: Just quick clarifications, on the Jan quarter, do you think it will be a record level for SSG or not? And secondly, any color on H1 next CY? Your commentary on 2018 seems to be fairly confident. Is it fair to say that the early trends that you are seeing in 2018, they are looking pretty strong right now?

<A - Robert J. Halliday>: It's strong. And we said in the call that Q1 was going to be a good fiscal quarter for us and we said semi was going to be incrementally stronger than the comp. And display not quite as strong as the comp in Q4 that we just guided to. So if you look at we were close to record in SSG this quarter, I think the record was last quarter, Q3. I think there's a pretty damn good chance we're going to beat the record in Q1.

<Q - Farhan Ahmad>: I was just – calendar first year, is there any visibility that you have, that makes you confident on H1 – on the next year overall?

<A - Robert J. Halliday>: What we said on the call, number one, was that we think next year WFE is up. We also think our position is really good. And we have a strong degree of confidence in our fiscal Q1, and we don't see that problematic after that. We think it's a pretty good year.

<Q - Atif Malik>: I just want to clarify. The 30% y-over-y growth for display, is that for FY2018 or calendar 2018?

<A - Robert J. Halliday>: Fiscal revenues.

<Q - Atif Malik>: And then can you...

<A - Robert J. Halliday>: Calendar is good, too. I just don't look at it that closely on a calendar basis.

<Q - Atif Malik>: And can you help us out, how much of that is market growth? I think in the past, you've talked about an $18B display spending this year. Is that mostly market growth, or are you baking in contributions from new products? Thanks.

<A - Robert J. Halliday>: If you look at it in 2017 and 2018, our total revenues are going to be up about 30%. If you go look at the market in 2017 – 2018, it's going to be healthy, and our position is going to strengthen. And what we alluded to a little while ago that we're going to have some new product introductions. In fact, we already had one about a year or so ago, we're going to have more. So I think we'll get some contributions from the market and our position.

<Q - Harlan Sur>: You guys had discussed the growing number of programs for large-screen LCD in your forward pipeline. A few weeks ago on their earnings call, LG Display discussed spending about KRW 20 trillion of OLED CapEx over the next four years. That's about U.S. $18B, and much of it is actually for large-screen OLED. And I think the view is that OLED TV volume is going to grow from 2.5mm – 3mm next year to something like 6mm by 2020. Can you guys just remind us on your position in large-screen OLED, your views on how you see the market evolving? Clearly, I think it feels like it's the next big driver after the mobile adoption.

<A - Robert J. Halliday>: I'll give you some factoids on the overall market, which you had touched on, Harlan, and then a little bit on the OLED, and then Gary might join on that one too. So in terms of – I'll give you the factoid. I don't think we've mentioned it yet. From our call, which I think was three months ago, our expectations for the total market of display equipment has gone up for all five years in our window, 2017, 2018, 2019, and 2020 and 2021. All five have gone up. And we see strength across the board basically in both TV and mobile, a lot of big TV factories and increasing strength in mobile. So it's a very strong market position, even more so than three months ago. In terms of our product position, we're going to continue to introduce new products.

In terms of OLED TVs, what they're doing is this white backplane stuff with a color filter I guess, so it's not the same OLED as you have on mobile, but it is a version of OLED. And our position is pretty good there, but it's not the big technology inflection, which has as much percentage growth in TAM availability for everybody as you have in true OLED on the mobile phones.

<A - Gary E. Dickerson>: We've been increasing our share with pretty much all of the customers. And certainly, in this inflection also, we have an increasing position, so it's a very positive driver for us longer term.

Relative to the inflections and the market outlook, we're still in the early innings of OLED mobile. So as that continues to get built out, that's a big positive driver for us. This adoption of larger screens in TV, we talked about the 13 Gen-10.5 factories. That will be built out over the next several years.

And then if you look at the investments that large technology companies are making, VR, AR, automotive, there are other types of display technologies, foldable displays, those other inflections that could be more significant if you look at it in the three to five-year timeframe. But we have good exposure to all of those changes.

<Q - Krish Sankar>: I had a question on display. Samsung has been going around saying their display CapEx is going to be down next year, but you guys are guiding to up 30% for revenue. And I understand you're getting some new products introductions, so a two-part question. How much of the growth next year is driven by new products vs. the existing product line? And along the same path, can you split up your revenue – display revenue by LCD vs. OLED for this year and next year? Thank you.

<A - Robert J. Halliday>: First I'll do the market, then I'll do a little bit on us. So we think the total spending by display manufacturers is up this year and up again next year. We think it's pretty strong in both TV and mobile. So the big TVs are driving the CapEx spending on TV, and then mobile is mostly this OLED driver. So we see upside in total. We see upside in TVs next year. And we also see some upside potential in mobile next year. And part of that is you see

a proliferation to mobile phone display manufacturers beyond the big one in Korea.

So if you think about the factoid we gave you in the last couple quarters, if you go back to our sales of OLED equipment in FY2016, roughly two-thirds was to the biggest manufacturer of OLEDs. We've now proliferated to 10 different people buying some equipment from us. And the big guy, in terms of commitments of orders this year, FY2017, is significantly less than 50%. So what you're seeing is next year can grow because TVs are good, and you have a proliferation of more people making the mobile phones.

<Q - Toshiya Hari>: I was hoping you could elaborate a little bit on your view on China into 2018. You talked about having relatively conservative assumptions embedded in your WFE forecast for 2018. But what exactly are those assumptions, and what would be the bull case over the next 12 to 18 months? Thank you.

<A - Gary E. Dickerson>: China is one of our strongest regions in both semiconductor display. Our business has grown a significant amount. If we look at 2017 vs. 2015, we're up 2x in semi, 50% growth in service, and 50% in display. In 2016 to 2017, we anticipate we're going to be up more than 20% overall in China.

We track all the projects. We have very close relationships and very high share in China, so we're tracking all the projects for all of the customers. And we have leading indicators for the most likely investments. There's a lot of discussion about investment, but we qualify that based on these leading indicators. And based on all of that, 2018 we think will be up an incremental at least $1B, probably in the range of $1B to $1.5B in 2018.

Longer term, we think that this number is going to continue to grow because of the strategic nature of the investment. In China, they're trying to grow their percent domestic content, build a secure supply chain and it's a long-term strategy. The investments are not as efficient. Many of the investments next year will be in pilot lines in China, but we believe that this market will continue to grow over time, and our position is very, very strong in both semiconductor and display.

<Q - Joseph L. Moore>: I want to ask about the growth in services. You talked about 15%, it seems pretty good. I know you've had a strategy of trying to improve that opportunity. Can you talk about how much of the growth you're seeing is just because of the significant increase in the installed base of tools vs. some of the other things you might be doing to drive that growth? Thank you.

<A - Robert J. Halliday>: If you look at it, if you go back, longer-term, historical perspective, we used to be kind of flat around $2B a year back around 2013. This year, we're going to do about $3B. And if you look at the rate of growth year-on-year, it's 15.9%. But if you look at the quarters, you'll see the momentum picks up even throughout the year. So I'm pretty confident that the next year is a strong year for us, and probably the momentum is as strong, maybe a little better than this year for some reasons.

One, if you look at your service business, it's a function of two things: the market, your position and your strategy to attack the market. Three things, I guess, market, product and position, and strategy. So if you look at the market, WFE is pretty damn strong. It's a pretty big number this year and next year, so that provides a toolset that you can service.

And then if you look at a percentage of the market for us, we used to be 17.8% of WFE just for 300-millimeter tools back in 2013. And this year – last year, we were at 22%, and we're going to go up again this year. So got the bigger piece of the market.

Thirdly, if you look, where we've gained a lot of share – we've gained a lot of share in places like edge, which is pretty good entitlement for service. So all the dynamics on the market, our position, the products we're selling is raising our service entitlement. And then secondly, what we have done or thirdly, that was market and our position.

Thirdly, in terms of our strategy has improved more and more. So if you look at it, instead of selling parts and ad hoc labor, we are selling long-term service contracts. We talked about getting 1,000 extra service contracts per year. And that means we have a more predictable, more sustainable and greater value for the customers and ourselves that again raises our service entitlement. So, my guess, the rate of growth in service business is going to be pretty strong next year.

<Q - Romit Shah>: It seems like the DRAM industry is at a crossroads here, whereby, with the conversion to 1x, bit supply growth is going to decelerate into the teens range. And that's well below what people are thinking in terms of DRAM bit demand, call it, 25%, 30%. So, it would seem like next year we do see capacity increase, and I know you guys are positive on that segment for 2018. And I was hoping you could just share your assumption for capacity additions in DRAM.

<A - Robert J. Halliday>: I'll give you my opinion and Gary can jump in. So, if you look at the dynamics, three of our four big memory customers do both DRAM and NAND. I personally believe there's slightly different strategies in DRAM and NAND. If you look at NAND, the elasticity of demand for NAND is probably pretty damn big. There's a lot of growth in NAND and they're going to eat into hard disk drives. Then if you look at DRAM – so they're going to spend there and grow their addressable market and make a bunch of money.

If you look at DRAM, I don't think the elasticity of demand is quite as big. And then if you look at shrinking, you nominally get 28% more bits roughly per wafer, but because there's more layers, you get less wafers out of the same building because there are more steps, and that's where the capital intensity comes in. So, you're sort of getting 14% growth in kind of output of our factory.

So, it's getting expensive to keep growing effective bits. So, now what do you do? Well, if you have a total company strategy, you're probably going to invest pretty heavily – more heavily a little bit in greenfield for NAND to grow the addressable market and make money, you're probably going to do more heavily weighted on conversions for DRAM. So, what we see our estimates is in 2017, you probably got about 75,000 wafer starts adds and convert to 240,000 to 250,000.

But the net adds is probably even a little less, because I think it's like 50,000 or maybe a little less, because you're effectively shrinking your output a little bit with all those others because of more layer count. And we look at 2018 similar numbers, kind of 75,000 adds and convert to 290,000 maybe. But it's more weighted to conversions than adds because of the economics.

<Q - Patrick J Ho>: Looking at the foundry market, clearly, you're benefiting right now from capital intensity trends going to the 10 and 7-nanometer node. But could you discuss maybe how that node may develop over time? And could you see that node being potentially as large as the 28-nanometer node, which has been very profitable for the chip makers? Is it possible that this is the next big node that we see and this could be a multi-year event for the foundry segment?

<A - Robert J. Halliday>: The answer is yes, yes, and yes. I won't give you more than one-word answer. So, if you look at its peak, 28-nanometer, I think, peaked out at 335,000 wafer starts. Earlier in the year, about nine months ago, our estimate that 7-nanometer would peak out, it's kind of 10-nanometer going to 7-nanometer. 7-nanometer I'll just call it, would peak out at –originally, we said 250,000, then 260,000, then 280,000. We're currently at 300,000 wafer starts.

There might be upside to that because what you get is more and more applications for 7-nanometer devices. It's going to be all the typical processes stuff, mobile phone stuff. But you're going to get more and more into this cloud stuff, you're going to get into the cars with probably 7-nanometer devices. So it's probably going to go long and big, like 20-nanometer.

Now the good news – there's a bunch of good news in there. One, it's big, that's obvious. Two, it's long. So then you start to roll forward and you say, hey, does a lot of this roll to 5-nanometer or does it stay at 7-nanometer, because if you think of the product lives in the car industry, which aren't big now, you stay at a node for a while. So there's probably not as much reuse, my guess, down to 5-nanometer, right?

The third thing, which is really interesting is, if you look at capital intensity is picking up from 28 to 7, you'd say, well, okay, Bob, it's 335,000 to 300,000, you're down 10%. Capital intensity from 28 to 7-nanometer nodes is up over 90%. So, to make those wafers, there's a lot more equipment sales and so our position's really good. It's going to be a bunch of equipment sold, the customer is going to make a lot of money, it's going to be big long node.

<Q - Y. Edwin Mok>: Just quickly on margin, I have I guess a two-part question. One, I noticed that your service revenue just hit a record, like you suggest, and margin actually came down, actually lower and the last few quarters that's...

<A - Robert J. Halliday>: I'm sorry, Edwin. Edwin, wait, wait. Edwin, you pinged out a little bit. Would you repeat the question, please? I just couldn't hear it clearly.

<Q - Y. Edwin Mok>: A two-part question on margin. First is service margin, I noticed that it came down this quarter. Wondering why – what's the driver for that? And in display, with the revenue increasing by quite a bit this quarter and you guys guiding for higher revenue, is it possible that display get to the semi margin level sometime in the future?

<A - Robert J. Halliday>: First I'll do service margins. Yeah, he's looking at our operating margins. So, here's the trend line, and they can pull up service – okay, let me get the data here, Q3, Q4. I think service gross and operating margins are up a little bit in Q3 and up more in Q4, actually. And our trend line is they're going to go up.

So, I think what you'll see, I'll give you some longer-term perspective on where we're going, that might help. We used to be 23%, 24% operating margins in service. And then in full year 2016, we were probably 26.5% or 27%. This year, the guide is like 28%, frankly, and we're going to trend up a little bit more.

So, the operating margins trend up, gross margins are trending up some, too. So, I think generally, the trend's pretty good. What's driving the trend line in margins? Revenue grows pretty darn good. Gross margins trend up a little bit, and you get drop-through because you get the percentage gross margin and you get the leverage of the revenue growth. So, I think operating margins are going to trend up and gross margins trend up in services.

<A - Gary E. Dickerson>: One other thing I would add in terms of service is, we've really done a great job in driving lower cost. We're moving a lot more content into lower-cost regions. And customers are also facing big challenges in the technology ramps for logic and also for memory. Our opportunity, Bob talked about earlier, in service contract is also increasing our revenue growth. So, we're driving lower costs. We're driving greater value for customers. And that is increasing our overall operating margins and giving us a momentum going forward in the service business.

<A - Robert J. Halliday>: And then display you asked about, Edwin also, display operating margins and gross margins are tending to trend up. If you look at operating margins for display, 2012 they were about 9.8%, 2013 was 16.8%, 2014 is 24%, about 25% in 2015, 2016 was about 20%, 21% we are investing. This year will be about 26%. Next year should be up with the volume. So, I think we're going to do pretty well in display.

Now if you look at the longer-term model, which we'll show on Analyst Day, last year the Analyst Day model we showed that, generally, our operating margins and gross margins are higher in semi, but services and display are both – they're all increasing. And what you'll probably get is high-20s in service and display, and higher 30-some things in semi, and the overall average goes up.

<Q - Weston David Twigg>: I just wanted to dig back into the visibility you have with your large memory customers. And the reason I ask is, just six to nine months ago, your outlook for the year was substantially different. And so that implies very low visibility at some of these large customers. And I'm wondering if that visibility has actually improved or really you're commenting on the trends as you look into 2018.

<A - Robert J. Halliday>: I'll give you some historical perspective. We do forecast historically based on – we talk to the account guys, we talk to the customers and then the marketing guys look at trend data and underlying drivers. When we do a one-year forecast, it's a little bit more weighted towards talking to the account guys. And the customers' communication of second-half visibility to us is moderate. Sometimes they don't know, and sometimes they don't want to disclose it, frankly, because it's a competitive issue for them.

So my belief is that the semi cap industry probably underestimated H2 this year. And if we had done a lot more deep thinking on it, we might have estimated a little higher number in H2. And there was one particular customer that was much bigger than expectations. So if you go look there, we've spent – me personally included, have spent a lot more time on root cause drivers, what – not just what the customers tell us, but what are they selling. What are the devices going into, what is the content in the phone, what is the content in the PC, what's the content in the cloud?

So for instance, if you look at the delta from what we thought ended 2016, it was content, it wasn't unit count of phones, it was content in the phones, content in the cloud. That is continuing for this year. If you say what device type is up this year from our earlier expectations, across the board, but it's NAND, DRAM and foundry, but NAND's probably the biggest increase, but at one particular customer in particular. So we're spending a lot more time going through root cause drivers of what's driving the NAND. So I probably have more confidence than I did a year ago about the outlook.

<Q - Craig A. Ellis>: Wishing you the best as you move forward and evolve through all. I'm going to ask you to take another longer-term view on the end user as you did with foundry, except this is in DRAM. And what I was hoping you could you do is just look out beyond the next few shrinks that we're likely to get to some of the alternative architectures. And the question is really around the equipment intensity that AMAT might be seeing with any of the successor architectures that would be there for DRAM. Is it higher? Is it lower? Is it a mix? What's the company seeing longer term for the extension to volatile memory as we know it? Thank you.

<A - Robert J. Halliday>: I'll start with more general stuff. Gary will do the more technical stuff. I generally am optimistic about the industry and the various device types, but there's going to be granularity to some of that. So I believe that these drivers that there's greater and greater valuable applications for silicon than there used to be because you basically, A), leverage all the fiscal assets in the universe more efficiently through silicon. And two, I think a lot of the incremental consumption of entertainment and healthcare will be leveraged by silicon. So I think the cosmic drivers, whether it's on automobiles, hotels, healthcare, you name it, silicon is going to play a big role in this. So, that drivers

Now that said, how you make money in life is two ways, scale and differentiation. So, if you look at the scale of these things, they're very big, including scale up at the cloud, where they have huge volumes. And the differentiation in some of these solutions, what does that mean? I think you're going to have more different tape-outs of more different type of devices than you've had before. I think you'll see the ASICs chips, you'll see the graphics processor units. I think you'll see different types of high end, low end, different types of DRAM. And I think you'll see different types of memory. So I think you're going to get proliferation, more devices and more designs, which is all good for us, frankly.

And then, if you go to, what do I think about alternate memory? I think NAND is going to grow for a while into the hard disk drive. I think DRAM and alternate forms of memory, there will be ones that segment the market and solve different products because of volume up there and the differentiator is so valuable that you can go to different design types. I don't think it's going to be one shoe fits all feet.

And then thirdly, in terms of capital intensity, capital intensity by device type is up across the board from a few years ago 30% to 90%. And I don't see that trend changing for all the new devices either. Gary?

<A - Gary E. Dickerson>: I would also agree with Bob that you've got big investments being made by leading companies to drive transformative changes that shift economic value in major industries. That's going to create a great opportunity for memory, for high-performance computing, all of those different areas. Also, if you look at what's happened in memory over the last few years and what's driving the market today, tremendous innovation in the architecture, driven by materials innovation, what we do better than anyone else.

And we're working with very large companies on, certainly, extending current memory technologies, scaling 3D NAND. But we're also working on new memory technologies. And I really believe that the pace of innovation is going to accelerate. And really, at the foundation of that is Applied Materials with materials innovation. So I'm pretty optimistic on the overall market opportunity. I'm also even more optimistic about our position to grow as these changes happen.

<Q - Jagadish K. Iyer>: You talked about Gen 10 fabs on the display side. So I was wondering how much of it is going to be OLED. And as a bigger picture, if this large-scale transformation to OLED happens, are we going to see a new baseline to your display revenues? Thank you.

<A - Gary E. Dickerson>: The Gen 10.5 factories are really focused on TV, and all of the 13 projects that we're tracking right now are not OLED factories. They're again large area. We're seeing an increase in terms of the area consumption for large screens. And it's way more efficient to go to these larger factories from a cost perspective, so that's what's driving that. Certainly, we're also very optimistic about mobile OLED and the opportunities that we have there. We're still in the early innings. But the driver for Gen 10.5 is larger TV screens. I don't know, Bob, if you want to add anything else.

<A - Robert J. Halliday>: I do think there's a hell of a lot of upward directional arrows in general for the market. And so the new baseline of revenues is increasing for display, which was one of your second parts of your question, Jagadish. And if you look at the inflections, it's not just bigger TVs. In my mind, it's not just OLED. Those are really powerful.

I think there are other inflections like – on your simple phone you have now as you go to the wraparound, take the top and the bottom off the chin in the phone, you get 40% more service area. We sell service area, whether it's layers or size. Then I think you're going to have foldable in a few years, which doubles the service area of a phone or an iPad I guess. And then eventually you're going to have some OLED proliferation, as you mentioned, in TVs, whether it's wide OLED or something further down the road. All of these lead to more spending.

Now the question people would have asked a year or two ago is, gee whiz, historically, you might have $32B in WFE spending and $8B in display spending, and shouldn't it stay at 25%? No, because the drivers are very different. Display is a huge application across the world in TVs, mobile phones for different tasks, and the layer count to increase the visual content of that is doubling. So, I think the potential to display market is pretty big.

<Q - Toshiya Hari>: I had a question on gross margins heading into next FY. Bob, you talked about display growing 30% y-over-y. I'm guessing, at least at this point, you don't have as high expectations for the semiconductor business. Do you think you can improve gross margins into next FY? Thank you.

<A - Robert J. Halliday>: Our goal is to increase gross margins every year. I think this year we've done particularly well. We're going to be up a couple of points or almost three. We're going to be up like 2.9 this year or something like that. We're up a lot. Okay?

That's a lot of things. I mean, I think we've executed by product across the line. So, if you look at our gross margins by every single product in the company, every BU in the company which number between AGS, service and semi like 13 businesses. Every one of the gross margins is up from 13% to 17%. So, across the board, good execution.

Mix this year is pretty good. It's a good semi year, but it's also pretty big display and services year. So, my take, there's an opportunity to go up next year, but we haven't run the models, but it'd be hard to do as well as you do this year. So, my average goal and Dan is going to go through the numbers what I've said in the past is, our average goal is kind of seven-tenths of a point a year. And if we do anything like that, we're already kind of ahead of the 2019 model. So, I think there's still room.

Daniel Durn

Summary

Markets

- I think it's probably good to summarize a few key points from today's call
- First, I hope you share excitement that Applied's markets are substantially larger and more attractive than they've been historically
- We expect another record quarter in Q4 with that line of sight to continued momentum in Q1 and far beyond

Service Businesses and Profitable Growth

- Second, Applied is uniquely positioned to outperform our core market, further building on our leadership in semis, growing the unique opportunity we have in front of us in display, and expanding the service businesses
- Third, we're more profitable than we've been, and we have many levers to keep driving the profitable growth