Maria: Hello, everyone. This is the Analog Devices webinar. My name is Maria Tagliaferro. I'm the head of Corporate Communications for ADI. I want to thank you all for joining us for today's webinar.

Yesterday, on October 14th, after the market closed, we announced the sale of the assets of our microphone product line to InvenSense for $100 million in cash. You can find our press release regarding the announcement at our website, Investor.Analog.com. The agreement firmly aligned ADI's core MEMS sensor technology with the markets we believe offer ADI the highest growth potential and those are namely automotive, industrial, and the submarket within industrial of healthcare. And it is this opportunity in the high-performance inertial sensors market that we will be discussing today.

Today's webinar is the first in a series focused on exploring the growth drivers behind our business. As many of you know, nearly 85% of our revenue is centered on applications within industrial, automotive, and communications infrastructure. In this webinar series, we'll present key technologies and trends, driving growth in each of these areas. Today's webinar topic is MEMS sensors, representing one of ADI's fastest-growing technologies and encompassing a portfolio of inertial sensor products. During today's webinar, you'll learn how ADI has leveraged our success, supplying MEMS sensors for automotive safety electronics, to create a portfolio of accelerometer, gyroscope, and inertial measurement units with industry-leading accuracy, quality, and reliability. This level of performance and functionality is not only displacing a legacy sensor system, but also enabling new applications that simply were never before possible. The result is a rapidly expanding available market, growth rates well above ADI's corporate average, and the beginnings of a franchise ADI excels at serving, where lifecycles are very long, the applications are diverse, and the customer base is stable.

I'm joined here today by Mark Martin, ADI Vice President for MEMS Sensor Products and Technology, and Dave Zinsner, our Chief Financial Officer. We will answer your questions after a brief presentation on MEMS technology and the application for high-performance MEMS sensors. But at any time, you can submit those questions online through the submit-question box that you should be able to see on the screen below these slides.

With that, let's begin with a brief presentation that will take us through our MEMS sensor portfolio.

VIDEO For us in the MEMS Sensor Group, it all starts with high-performance MEMS sensors. And when we talk about high-performance sensors, it's really the combination of complex, high-precision sensor element, bringing that together with high-performance analog and mixed-signal circuitry. And when those two factors

come together, that's when ADI can really show our leadership in the market. And that foundation really starts with automotive where we've been a market leader for many, many years. We're leveraging all of that experience into what we're calling a high-performance inertial MEMS strategy, outside of automotive, where we're targeting industrial, medical, and some select high-end consumer applications.

Our modern world is experiencing an explosion in the number of applications integrating sensors. Sensors are used to translate real-world phenomena, such as temperature, pressure, motion, sound, and light into electrical signals. There are billions of sensors in use today, with some estimates as high as six sensors per person. Sensors are found all around us, in cars, industrial robotics, buildings, and mobile devices. This ever-expanding array of applications with multiple sensors and multiple sensor types per application, is being driven by four macro trends: The pursuit of energy efficiency and environmental protection where sensors measure and monitor energy usage and emissions in homes, buildings, municipalities, and factories, as well as aid in the exploration for fuel; the heightened need for safety and security, where sensors identify people through biometrics, provide surveillance with high-resolution images and sounds, detect intrusion with motion, and even monitor the safety of food, air, and water supplies; the implications of a growing and aging population on healthcare costs and services, where sensors are used to improve surgical procedures and diagnostics, as well as monitor patients by measuring vital signs, glucose, and activity levels; and the continued enhancement of the user experience in electronics through touch, gesture, voice control, and motion control. Together, these trends will drive the sensor industry to exceed $95 billion by 2016, according to Frost & Sullivan.

Surrounding all these sensors are signal processing integrated circuits, including the converters, amplifiers, and linear products that have been the specialty of Analog Devices for nearly 50 years. And in certain of these applications, Analog Devices is also providing innovative sensor technology. These specialized motion sensors combine MEMS technology with signal conditioning, conversion, and processing circuitry to solve an emerging class of high-accuracy measurement and monitoring problems. These design challenges emerge in applications such as industrial instrumentation, medical, aerospace, defense, and transportation, including automotive safety subsystems where ADI's sensor portfolio began.

The acronym MEMS stands for micro-electromechanical system. It's a broad term that applies to a semiconductor with moving parts. Most semiconductors are 100% solid-state devices, nothing moves except for the electrons. But a MEMS sensor is a very special type of semiconductor that is designed with microscopic structures that move. And ADI has perfected electromechanical structures that respond to acceleration, vibration, shock, tilt, or rotation. Within an ADI high-performance MEMS sensor, material has been etched away so that a very thin layer of metal,

called the proof mass, is suspended over the semiconductor substrate. The proof mass is suspended above the substrate in a few key places. These suspension links are designed to work just like the springs that hold up the fabric of a trampoline. To detect and measure the motion of the mass, a series of metal threads along the edges of the proof mass, called fingers, are interlaced with reference fingers attached to the substrate below. When there's motion, the proof mass moves relative to the substrate and the gap between the fingers changes. This gap can be measured by the change in the electrical charge surrounding the fingers. The charge is a very, very faint analog signal that requires additional circuitry to amplify, sample, convert the signal from analog to digital, and then process the digital data into useful information about the motion being experienced by the sensor. That was obviously a very basic description of what is arguably one of the most complex areas of modern electronics. In fact, ADI has more than two decades of accumulated intellectual property and trade secrets that span core technology and circuit design, manufacturing, test, calibration, and the packaging of MEMS devices.

From the very start in the early 1990s, ADI was able to achieve the high levels of accuracy and reliability required by complex and mission-critical applications. The result was the first use of a monolithic MEMS device to trigger airbag deployment in automobiles in 1992. The size, cost, and reliability improvements enabled by ADI inertial sensors were instrumental in making airbags standard features in most automobiles, and the applications in automobiles are continuing to expand as preventive and even predictive safety features emerge. Because ADI inertial sensors are very small, very precise, and consume very little power, they're increasingly replacing conventional sensors, such as fiber optic gyroscopes and ring-laser gyros in existing applications, as well as enabling entirely new applications. In total, industry analysts estimate the market for MEMS sensors will exceed $17 billion by 2016, with approximately 25% representing inertial sensors as a wide range of applications embed functionality such as platform stabilization, pointing, positioning, or placement, navigation and crash, shock, or fall detection. High-performance inertial sensing enables platform stabilization, which prevents spinouts in a moving car or truck, improves road grading accuracy in construction equipment, and helps agricultural systems respond to variations in terrain. High-performance inertial sensing enables very accurate pointing, which points a Coast Guard ship's antenna at a distant satellite, keeps a natural gas drill-bit on course through many miles of rock, and precisely aims a beam of therapeutic protons at a tumor. High-performance inertial sensing enables precise placement or positioning, which controls an industrial robot during complex assembly processes, enables robotically-assisted open heart surgery, and flawlessly aligns and implants an artificial knee. High-performance inertial sensing enables navigational information, globally or locally, which tracks the location of firefighters within a burning building, augments GPS position sources for greater accuracy or when GPS

satellites are blocked in parking garages, tunnels, or city centers. High-performance inertial sensing enables accurate and instantaneous detection of a crash, shock, or fall to warn caregivers when a patient falls or becomes immobile for an extended period of time, monitor the handling of valuable and fragile goods in asset-tracking systems, and detect concussive forces experienced by athletes during play. Many of these applications were simply never before possible, while others are transitioning away from conventional mechanical systems that are often big, power hungry, of limited sensitivity, and intolerant of harsh environments or extended periods of use.

The ADI inertial sensor portfolio includes three categories of products – accelerometers, gyroscopes, and inertial measurement units. Accelerometers are used to detect and measure velocity along one, two, or three axes, as well as tilt, shock, and vibration. In this novel application, ADI MEMS accelerometers embedded within the communications earpieces of Indy car drivers measure and record the impact to the driver of G-forces from every bump or collision. The earpiece sensors complement the accident data recorder in the car, which is also equipped with ADI MEMS sensors. These two data sources are then used to create accurate sled tests for driver safety improvement to helmets, shoulder harnesses, driver position, and padding. This application also extends to other types of safety headgear, including football helmets and mouth guards. ADI MEMS gyroscopes detect and measure an object's rotation in degrees per second around one, two, or three axis, often referred to as the pitch, roll, and yaw axis. Anti-skid or anti-rollover in cars is a platform stability application. As the centerpiece of a vehicle's stability control safety system, ADI MEMs gyroscopes provide mission-critical data to detect and avert an impending skid or rollover. Government regulators are mandating the use of this platform stability application. In many applications, customers must integrate a range of inertial sensor types to achieve the functionality desired. This integration is part of a customer design trend called sensor fusion and the breadth of ADI's inertial sensor portfolio, including both a range of high G and low G sensors is a key advantage in leading the sensor fusion design trend. For example, ADI MEMS inertial measurement units, or IMUs, are highly integrated devices that measure and manage complex 3D motion. In a navigation application, the customer must fuse together information collected across 10 sensor measuring and monitoring channels. The ADI inertial measurement unit senses three axes of linear acceleration, plus three axes of angular rotation, using accelerometers and gyroscopes, respectively. In addition, a 3-axis magnetometer senses orientation relative to the earth's magnetic field and the 10th degree of freedom comes from a barometric pressure sensor used for measuring altitude. In all, this IMU supports 10 degrees of freedom.

IMUs require a tremendously high level of expertise to design and advanced capabilities to manufacture. As seen in this video clip, a key differentiator for ADI

is full characterization and factory calibration using proprietary, full-motion testing protocols. These highly integrated plug-and-play MEMS solutions are ready to go right out of the box, including embedded compensation and sensor processing, and a simple programmable interface. The significant time and expense saved is highly valuable to customers.

The automotive industry provides an excellent example of how sensor fusion is making new capabilities possible. The fusion of multiple sensor types working in concert within a vehicle, make possible today's advanced safety systems that can predict an accident, prevent an accident, and if unavoidable, protect during an accident. Predict focuses on literally predicting an accident before it happens. For example, sensing the pedestrian that just started walking into the vehicle's path, or the stopped vehicle that went unnoticed by a distracted driver. Prevent detects the start of a spinout or rollover, then uses engine and braking controls to pull the car back into line and prevent the accident from developing. Protect focuses primarily on protecting passengers from injuries when an accident is unavoidable. Seatbelt pretensioners, emergency braking, and most importantly, advanced airbag systems must deploy rapidly and reliably. These safety systems require the fusion of large amounts of real-time information from many different sensors, including gyroscopes, accelerometers, radar and sonar, as well as high-performance signal processing circuits, to capture, condition, and convert the signals.

Wherever sensors are found, the electronics to capture, analyze, and act on the information fits squarely with ADI's analog and mixed-signal processing technology. The utility of the sensor can be enhanced or destroyed by the linear conversion and signal processing technology that surrounds it. Here, ADI has profound advantages. Engineering the complete signal chain needed to convert raw motion into application-ready information, signal processing technologies to extract usable data from very challenging end-use environments, circuit design innovation that enables ultra low-power devices with battery life spans of over 10 years, a significant advancement for devices in non-accessible locations, and the semiconductor industry's highest quality and reliability for mission-critical applications. Whether a replacement opportunity or an enablement opportunity, the applications for ADI MEMS sensors are well-aligned with ADI's key strategic markets of industrial, automotive, and communications infrastructure, as well as select consumer, healthcare, and entertainment markets. While the annual growth rates of the equipment markets ADI serves very widely, virtually all of these applications, from agricultural machinery to unmanned aerial vehicles, are growing faster than 10% annually. And many, in areas such as video surveillance, energy, healthcare, and asset tracking, are growing substantially faster. The electronic content surrounding sensors and replacement of large-scale mechanical and electromechanical sensors is driving still faster growth opportunities in the served available market for high-performance signal processing. As a result, the MEMS

sensor business has been one of ADI's fastest-growing technology areas.

Importantly, with hundreds of existing and emerging applications, and the potential for thousands of customers, the MEMS sensor business is perfectly aligned with ADI's franchise position in high-performance signal processing. Here, high precision, long lifecycles, high reliability, and the high value of technical innovation are the foundation of strong profits and solid growth. Clearly, sensors make perfect sense for ADI.

Maria: That was a good overview, it keyed up a lot of questions that we have here. Again, folks, this is Maria Tagliaferro and I'll be reading your questions off of the website to my guests here, Mark Martin, Vice President for our Sensors Product and Technology Group, and David Zinsner, our Chief Financial Officer.

First question, actually, takes us back to the microphone. We have a listener who asks, having seen yesterday's announcement about the sales of the microphone, Mark, can you tell us a little bit about the thought process behind the deal?

Martin: Sure. Good afternoon, everyone. First of all, I think the real thought process on the deal was, it's really for us, it's all about focusing on our actual, our inertial sensor business. We've a longstanding position in automotive and the industrial markets. We've been a longstanding leader in those markets and we see great growth opportunities there going forward, we need to fund those initiatives to sustain and enhance our position and drive growth going forward. And so that transaction was really about enabling us to focus on our key inertial sensor business and technology and then segments of automotive, industrial, and healthcare.

Maria: And sort of on follow-up to that, Dave, we have a caller who asks about the cash proceeds from the divestiture and are they are onshore and what might be the application for that?

Dave: That's a good question. We're actually in the process of kind of trying to figure out exactly where the cash completely resides. I'd say obviously some portion is going to be in the US. There probably will be some portion that ends up international. We have a couple of fundamental uses for the cash that we accumulate, both from operations and in the rare events that we have these kind of sales. Obviously, making sure the dividend gets adequately funded is important, although most of that comes, obviously, from cash from operations. But still, having some domestic cash kind of helps because some of the cash generation does happen offshore. We do have a buyback program in place and I think we have – I think we're looking to try to be aggressive in that space where we can. And that will obviously be another area for the cash. And then there'll be the one-off events where we have – want to identify technology or businesses that kind of take our

own technology forward. And in those cases, we're going to do a little bit of M&A with some of that cash.

I'd also add to Mark's comments around kind of our initial thinking. I think what we do is we kind of look at our investment level in total. And obviously there's always way more requests than there are – than there is a pie available to fund those requests. And we make tradeoffs in those cases and kind of look for areas where we want to double-down the investments and then we kind of utilize the areas where we are less optimistic about it to fund those. In some cases, when we take the cash away, we think that this is still a really great asset, that in the hands of the right company with the right model and the right approach, can really make it a much better business than we could ever make it in our model, in the markets that we're focused on. I think this was one of the rare – they tend to be rare – but one of the rare cases where we're going to – we had to take funding away because we think there's just other areas that we've got to double-down and play to win. And but here was a good business that a company focused on consumers, consumer products, that wanted this kind of product to augment what they're doing could really find some good value for us. And I think that's what we felt that was the case with InvenSense.

Maria: Excellent. Great. I guess also related to the microphone announcement, we had a listener who asks, without the sensors, what are the implications for Analog Devices in the consumer market?

Mark: As we said, in the case of our MEMS sensor technology, we're going to focus on automotive, industrial, and healthcare. But that doesn't mean there's not still great opportunity for ADI in the consumer market. We have – we're going to continue to invest in audio and algorithm and signal processing technologies, we're just not going to carry forward on the microphone. We still see a broad set of opportunities across the company with our signal processing technology into the consumer market, but in terms of our MEMS sensors, we're going to focus on the automotive, industrial, and healthcare.

Dave: And just also to add – I keep jumping on Mark here – but one of the things that I think we highlighted in our previous earnings call, I think we talked about in various investor forums that what – that we had some – a lot of optimism around our consumer business. And it was away from this microphone business, we're still very optimistic about things that we can do in the consumer space. Obviously it's going to be highly selective, could be in areas where we think we can differentiate relative to the competitors. The consumer business isn't going to be 30, 40% of our total business. It's going to be relatively small portion. I think it runs what, probably around 15% or so. But we're still incredibly optimistic about that business next year and we think we have good opportunities around the areas that

Mark highlighted to drive some growth there.

Maria: Let's get back over to the inertial MEMS sensor business. And Mark, can you talk a little bit about some of the macro trends that were highlighted in the presentation and give a little bit of color around those?

Mark: Sure. When it comes to sensors, the video covered it and I'll highlight some of these things. There's really four macro trends that are really driving the outsized growth for sensors today. User experience is one of those that tends to be very closely linked to the consumer market, that's less of a focus. But in the other areas, like enhanced safety and enhanced quality of life and energy and natural resource conservation, those three very prevalent market trends are really driving adoption of sensors. And a lot of those applications naturally fall to the automotive, industrial, and healthcare markets. And for example, a lot of times people will think about safety and you naturally go to the automotive application, which is the obvious one. But there are other examples of enhanced safety. I often like to talk about the example of earthquake detection in Japan or other areas, which are regularly(?) concerned about earthquakes. You can use inertial sensing, you want them to be extremely low power to build out networks to monitor earthquakes, for example. That's an example of the cultural trend toward always looking for enhanced safety, in addition to the obvious example, such as automotive. In energy and natural resource conservation, a great example is precision agriculture where many tractors and other kinds of vehicles in the farming domain are now loading up with inertial sensors to manage the very careful navigation of tractors across large farms, to keep them on track, deal with the bumping and bouncing and shock and vibration that they encounter, and keep them on track in terms of farming. And then in terms of the enhanced quality of life, you saw in the video there are natural things about elderly and how to take care of them, activity monitoring. But other health-related examples like concussion detection, which is very prevalent in athletics today. Those are some of the market trends that are really driving the above-average growth that we all see in the market today for sensors.

Maria: And kind of following up on that, we're talking about sensing motion and we have a listener who asks, why do you need the MEMS technology to do this motion sensing? What's the advantage you get from that?

Mark: The whole story of MEMS really since the beginning at Analog Devices, we were there in the beginning, shipped our first MEMS accelerometer into automotive back in 1991. And the whole premise on MEMS is that it really brings – it enables you to bring the precision of semiconductor manufacturing to sensing. A lot of legacy sensors are made through electromechanical systems, sometimes they're semi-handmade. They often suffer from long-term reliability, temperature drift,

yields are not so high. The real power of MEMS is you bring the precision semiconductor manufacturing, the ability to make many, many of these in exactly the same way. And then, in combination with that, you bring signal processing, traditional semiconductor signal processing, you can put all these things together. And what it really enables is really good sensors that stay exactly the way they were intended from the very beginning. They don't change, they hold their accuracy over time and temperature, and the markets really value that. And so you have this trend in the market where you have – this is really what's driving the growth in sensors, you have a natural replacement of these legacy sensors, often more bulky, higher power, less manufacturable, with MEMS sensors that have all of those advantages. And then on top of that you have – because we can make these things smaller, lower cost, lower power, you have a whole new set of applications that are leaping up where products that never thought they'd have a motion sensor in it are now including not just one, but in many cases, many of these motion sensing devices.

Maria: Interesting. The example you gave on the earthquakes really drives that one home where you can imagine the system gets installed some remote place and needs to sit out there working 24/7 for weeks and months and years...

Mark: And you need to rely on it, you need to know that it's going to work, not just in year one, but in year 10 and you also want it to be very, very low power, because a system like that often will be remote. It needs to run off of a battery and then you – and you need to know it's going to work when it's time to work.

Maria: Another question we have here is turning focus more over to the automotive area. The listener says, many companies are talking about getting into the automotive business, meaning many semiconductor companies. How do you view those competitors in terms of what is the threat, what are the differences that we provide? And are you starting to see new levels of competition relative to your MEMS portfolio in automotive?

Mark: Yeah, I think the automotive market presents a lot of challenges to new entrants. And if you looked at ADI's strengths, we've been in that market for awhile, having leading technology, being able to – is a starting point, but it's only the beginning. You've got to be able to produce these things at extremely high levels of quality. The volumes have continued to grow up and up, so you're going to be able to produce at the highest quality with the highest reliability in very high volumes and do that day in and day out. It's not just the technology, but it's those levels of quality as a service aspect to how you support automotive customers, and one of the things that's consistent with analog devices and it's related to both our automotive and industrial, we're used to making products that last for very long lifecycles. Automotive customers expect that the technology, the manufacturing

capability, all of these things are going to be around not just for a 3-year up and down cycle, but for 10, 12 years, sometimes even 15 years and beyond. And that's where the synergy between the automotive and industrial market really suits ADI. And I think for many other – many other players out there in the market who will potentially have the capability to do some of these devices in automotive, you've got to come with all of the rest of that and that's a very tall order to ultimately enter in and win in the market.

Maria: And also, coming with all the rest of the solution as well, since increasingly they're really looking for that.

Mark: Yes, exactly. So that is one of the other strengths that we have if you look at inertial sensors in automotive today, there's not only high G sensors for crash sensing, there's very high precision low G sensors and high precision gyros that go into stability control systems. People don't want – automotive customers today, they don't want to deal with just one inertial sensor, that supplier who has just one of those devices. They want to work with committed leading manufacturers who can serve all of their inertial sensor needs. And that's one of our real, real strengths when it comes to the automotive market. We have that full portfolio and back to some of the original premise that we put out here at the start of this webinar, it's those areas -- in order to continue to offer that broad portfolio and continue to lead generation after generation with our technology, we need to up those investments in order to sustain and actually grow and strengthen our position there. And we're operating off a strong base with that broad portfolio and we're very confident we can continue to build on that.

Maria: A little bit more detail here. What is the size – if we look at the automotive business which is about 20% of ADI's revenue, how much of that is MEMS or inversely, how much of the MEMS revenue is automotive? Can you kind of frame that for people?

Mark: In terms of our MEMS, in terms of our MEMS revenue, it's more than 50% of the business. It's probably more than two-thirds of the business.

Maria: And the remainder spreads across your…

Mark: The remainder is spread across industrial, healthcare, some select consumer applications and a lot of consumer applications that are still relatively high-end and performance oriented, not in the mobile and the smartphone market, but in other market applications. But it's really automotive and industrial and the healthcare is a very interesting area that's growing up quickly.

Maria: Question regarding the technology and just kind of get a sense of how much

integration is currently going on around the MEMS sensors, given that ADI has got the signal path portfolio. Can you talk a little bit more technically about the solution?

Mark: I think if you went back six or seven years ago, you would find that a lot of the inertial sensors that Analog Devices was producing and frankly others, were analog out and the amount of electronics that went around the sensors was modest. In today's world, almost all of the sensors that – to a 90% level, the kinds of sensors that we're producing are all digital out, which means you have a critical A to D conversion block in there. You have a lot of signal processing that gets wrapped around these things. So these sensors that we talk about are not just little sensing elements. There's a lot of electronics that gets wrapped around that. And this is one of the core strengths for Analog Devices. It's really about being able to do really precise, high-performance, high-reliability sensing elements and combining that with very high-performance signal processing and having strengthened both of those technology domains and being able to put those two together, be able to make the right tradeoffs, when do you need to enhance the performance of the sensor, when do you need to push up the performance of the signal processing, how do you make it all play together and deliver a low power end products at the end of the day? Having that command over all of those aspects of the technology really gives us some strong advantages, particularly as you push into some of these performance and high-reliability applications.

Maria: With so much of these products being integrated, I guess Dave, this question might go over to you. Where in ADI's reporting do people see sensors? Where are these MEMS inertial sensors in terms of how we report our revenue?

Dave: We categorize it on a product basis in other analogs. So it shows up in other analog, but along with a lot of other kind of unique products that can't quite be categorized as kind of converters or amplifiers or ESP or power, so forth. And it makes up a pretty big chunk, obviously, of the other analog space. And certainly, people who have been watching the other analog sub-segment within our business over the last five or six years, you've noticed it's probably grown pretty significantly and obviously a lot of that growth has come from the MEMS portion of the market.

Maria: We have a couple questions, see if I can kind of combine them here, around the technology. Just looking for sort of some basics on what is an accelerometer and a gyroscope and how are they different and maybe how are they used differently?

Mark: An accelerometer, the best way to think about it is it's measuring linear acceleration, movement and change, change in acceleration in an X, a Y, or a Z dimension. And in the past, we used to make single axis, X axis accelerometers.

Today it's most common, particularly in low G and by low G, it tends to be you're trying to sense changes in acceleration at the level of 2 or 4, 8 Gs, is typically what we would call low G sensors. Almost all of those devices today tend to come in the form of all three axis. So you'd be able – with a single device you'd be able to measure X, Y, and Z. And that makes it quite easy for the user in more precise low G applications. In the area of high G, this has been dominated by the automotive market, a crash sensor that might be mounted at the bumper of your vehicle, whether it be one direction or two directions. So either an X or an XY. It's interesting, in automotive applications today, the number of sensors continues to grow significantly. There are examples today of high-end cars that will literally have eight of these high G sensors spread around the vehicle. It's a very high-end car. The average is probably about – the average is probably less than half that. But there certainly is very big trends to put more and more of these around the vehicles. In terms of the high G acceleration, a typical crash sensor could be anywhere from 100 to 250 Gs, in a few extreme cases, even a little bit more from the 400 G. Obviously a crash is a big impact. But that technology it's very – that base technology that we've developed, we've come out with some unique products aimed at things like asset tracking, concussion detection. Unfortunately, a concussion on a sports field can be in that 100 to 200 G level and so that same automotive crash sensing technology that we've developed, we've come out with some unique products targeted for some of those fitness sports applications. So it's really about detecting a high impact in a single direction.

In terms of gyros, gyros are really all about measuring rotation and the video described that if you think about stability control systems in your car, you tend to be measuring a sliding action, a slight angular rotation in what was – is called the yaw dimension. If you imagine an SUV that's starting to roll over, you would tend to use a gyro to measure that roll axis as the vehicle is starting to tip. And then there's pitch, which is, imagine a vehicle that starts to pitch forward. That would be another angle of rotation that you would measure. So they're based off of the same foundational technology. They're built very, very much differently. But at the end of the day, both accelerometers and gyros have silicon that moves.

Maria: And so it sounds like a lot of applications are actually requiring both -- the car is the most obvious one. And we did touch on the idea of sensor fusion. How does the competitive landscape look in terms of that trend and where ADI is positioned?

Mark: We've actually been a leader in this sensor fusion area, particularly in the industrial market space. The video describes inertial measurement units, or IMUs. We've been building and supplying those into high-end industrial application for many years now. We're a recognized leader in that. And we are supplying up to what they call 10 degrees of freedom IMUs, which would have three axis of accelerometer and three axis of gyro, three axis of magnetometer, and a pressure

sensor, just to top it off. So that's a lot of sensing put into a single package. You saw in the video we do a lot of complex calibration in those high – in those high-performance IMUs. We have a lot of additional signal processing, a technique called common filtering is a way that you take all of those sensor inputs, you compare the results, you judge which ones are – which ones are accurate, which ones are correlated and you use all of that information to put out a very accurate result in terms of which direction you're heading or which – what heading you might be taking, if you're talking about an airplane, for example. These are very complex devices, a tremendous amount of technology and we've been leading in the industrial space. You start to see some of that coming into the consumer space, obviously the performance is in a completely different realm, and we're focusing on the high-performance aspects of the market.

Maria: Can you describe a little bit about the manufacturing process of these devices, what node are they on, what sort of technology we're using?

Mark: I think today the majority of the sensors that we build, you have a sensor process which is really hard to describe in terms of the typical technology node that people are used to talking about when it comes to CMOS. More and more today we have a patented manufacturing process that was developed by Analog Devices for sensors and we then combine it – we then combine it with the traditional ASIC or CMOS – bi-CMOS technology with an – a typical sensor will have a sensing element inside and an ASIC inside and we put those two things together. The ASIC technology node can be anywhere from – anywhere from .35 to 180 nanometer and below. So we really choose that ASIC technology node based on the complexity of the device, what kind of mixed-signal performance we're really gearing for and we have all the choices available to us.

Maria: And Dave, maybe this one goes over to you. Just to give people a sense of where the technology sits in terms of the company's margins, growth rates. How would you compare this relative to corporate averages?

Dave: I think you get, just from Mark's discussions and the prepared presentation before, that this is finding itself into a lot of applications in a number of different markets -- sorry, _____ in the microphone -- that usually indicates that the growth is pretty good. This has been growing at a rate that's faster than the corporate average and kind of consistent with sensors in general, which I think are growing at a pretty decent clip at this point. Margins are -- because I've been pressuring Mark – are a little bit below the corporate average and a little bit below the target. One of the areas that we've been trying to improve our margin has been in the area of MEMS and it relates to one specific kind of high-running product or product family that – then this initial launch wasn't quite designed for manufacturability, we'll say, and the margins were a bit under pressure. But Mark's come out with his team with a

new set of products and those products are kind of cannibalizing slowly the old parts and so the margins are kind of slowly moving up. I think, if I'm not mistaken, Mark, 2016 year kind of represents a pretty big adoption year where we might see a much bigger chunk of the revenue become this new part or parts with the higher margins, and thus, we'll probably start to see that really inflect at that point. And then the margins will be very competitive and kind of within the range of what most of the rest of ADI's portfolio is.

Maria: Maybe turning to given that designing motion-sensing technology into so many different applications, we have a listener who is trying to get a sense of kind of from a geographic standpoint, the adoption of the technology, particularly in China. What's the level of expertise that customers have and what do we have to do to make it easy for them?

Mark: That's a very good question. I think a company like Analog Devices where we've been selling signal processing components and technology for a long time, we've also been selling MEMS, but there's absolutely an education process, particularly in the broader market. When it comes to automotive, the customers that we're dealing with, they're very knowledgeable on this product and technology. They know how to use it and that's not really the challenge. But when you go out into the broader market, and particularly when you come on to customers and applications where they're replacing some other legacy sensing technology, or even more importantly, where you're enabling brand-new application cases and you have engineers and engineering groups who are trying to learn sensing – how to take full advantage, even how to evaluate MEMS sensor products, they face a lot of challenges there. And we provide all of the evaluation kits, we've got all kinds of webinars and training materials, and then we try to help customers move through that design process.

Now one of the other key attributes of our industrial portfolio is that we have – we do a lot of factory calibration ourselves. And this is a huge advantage for an industrial customer, for example, who's got an end product where MEMS sensor, MEMS motion sensor is going to augment and enhance his products substantially. And he doesn't have the core expertise. The fact that we deliver wholly-calibrated solutions can save him capital on his end to add additional expensive testing capability, will save him time in evaluation, because we're delivering a solution that he can really just plug in and play and go to work in terms of his design. It varies across the application space, significantly, but we take customer support and education very seriously when it comes to MEMS sensors. We see that as an important part of our job and how we can really drive the growth, is helping customers use the product and technology.

Maria: On a regional basis, it's not so much regional, it's really about the customer's level

of expertise and how much they want to put into learning how to apply the technology.

Mark: I don't see tremendous differences across the regions. It really goes – it really tends to go more by market application area and areas where inertial sensing has been an important part of development for quite awhile, it's less of an issue. But in those new applications, whether it's an engineer sitting in China or somebody sitting in France or something like that, they're going to face a lot of those same – a lot of those same issues.

Maria: Just a couple of questions left here. Competition-wise, can you talk about who the competitors are and how they might vary by market?

Mark: I think there's a set of competitors that are very prevalent in the consumer market, for example, ST would be a classic one who is clearly very, very focused on the consumer market. Somebody who's a competitor for us in automotive would be Bosch and in the industrial space you have – you have companies such as Honeywell, for example, who has been building a lot of these legacy sensors that are very expensive, and large. And ADI is really leading the way in terms of driving a move to MEMS in those high-performance areas. And there's more smaller niche competition in that space. That's a little bit on the competitive landscape.

Maria: I guess finally, as we're coming up to the end of our hour here, in the presentation, the total MEMS – or I'm sorry. The total sensor market of about $95 billion and the inertial MEMS TAM of about $5 billion, can you help us understand the piece of that that you're targeting and give a sense of the growth rate relative to the 9% that was shown on the slide?

Mark: Of that $5 billion inertial TAM, we see $2 billion of that $5 billion as servable by Analog Devices by focusing on the automotive, industrial, and healthcare market. And that's a very sizeable market opportunity that's performance, quality, reliability driven. And that's one of the reasons why the inertial space is so attractive. Of course there's a large consumer market space out there, there's a large consumer market space in a variety of sensing applications. And one of the biggest challenges in sensor development is there's no shortage of things you could do. It really comes down to a matter of what you should do and where you focus your resources and efforts. And for us, the $2 billion market space in inertial that combines automotive, industrial, and healthcare is a very attractive space. And that's where we're focusing our attention.

Maria: Lastly, Dave, maybe if you try to just give us some perspective on these webinar series that we're bringing out and the growth drivers behind our business.

Dave: Well, first of all, it was actually somewhat coincidental that we had this microphone announcement. In reality, we were planning on doing a webinar on our MEMS portfolio, because we were really excited about the opportunities in that space, kind of on a go-forward basis. We get a lot of questions about it and quite honestly, the IR team and myself, we're not that great at just providing all the technical answers. Better to get an expert and rather than get Mark traveling around to all kinds of different conferences, we thought one set webinar might make a lot of sense to give some of our investors a little bit more a depth of understanding about why we think this market is such a great place to participate. It just so happened that right around this time we're also selling the microphone business, so this actually dovetailed nicely. I think we're going to do an automotive one at some point. I think at some point down the road we're going to do a comp 1 and 2, and the idea is to pick market areas that we feel pretty excited about, where probably when you guys ask me the questions, I probably don't – I probably do a disservice in terms of my level of depth in those markets and give you a better sense of where we think we have some real opportunities to kind of compete and hopefully outgrow the marketplace and so forth. This is obviously the first one, love to get your feedback on it, but there'll be several more coming down the pike here pretty soon, and hopefully at the end of the day, we'll wrap this all up with a good Analysts Day sometime in kind of the early springish kind of zip code and kind of wrap it all together with an overall strategic story and a little bit more about the financial model and how people go forward.

Maria: All right, that's all the time we have. I think we did manage to take through everybody's questions. Any ones that we didn't get, we'll do our best to follow-up with you, and I want to thank everybody for joining us and please keep an eye out, you'll be hearing from Ali Husain, our Director of IR, with invitations to future events. Thank you.

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