Oklahoma Center for the Advancement of Science and Technology

Oklahoma Innovations Radio Show

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Guests: **Brien Thorstenberg**, Ardmore Development Authority; **Dennis Altendorf**, Director of Aerospace Strategy for the Tulsa Metro Chamber; **Rich Helfrich**, Alameda Advisors; **Web Keogh**, University Multispectral Lab

[Music]

>> From the OCAST Radio Network, this is *Oklahoma Innovations*, a weekly science and technology radio magazine brought to you as a service of OCAST, the Oklahoma Center for the Advancement of Science and Technology. OCAST is the state's only agency whose focus is technology, its development, transfer, and commercialization. OCAST's mission is to locate and fund promising technologies and allow Oklahoma to compete in a global market economy from our own backyard. This program features some of the state's most gifted and talented scientists and inventors, entrepreneurs, manufacturers, and business leaders who all have one common goal – developing technology-based economic growth for all Oklahomans. Now here are your hosts Gary Owen and Steve Paris.

>> We are on the road once again. This week, we're coming to you from the 2011 Sensor Summit and by the time you hear this program, the Summit will have long since occurred. But the Sensor Summit held at the Presbyterian Health Foundation Conference Center. And Steve, why do people go to the Sensor Summit?

>> What is the world does Oklahoma have to do with sensors? Well Gary, sensors have touched every part of our lives.

>> They really do.

>> And we'll give you an example to--but I just wanna point out that a lot of the world looks to Oklahoma. We're not the only place where sensor technology occurs but a lot of people look to Oklahoma because of what has happened. Across the state, there's a large concentration of sensor technology. It comes out of Oklahoma State University. But it happens to other places, too. And we have with us today, Brien Thorstenberg who's the--with the Ardmore Development Authority. Brien has been around for long time. He's one of those economic development guys that you know, if it wasn't for him and a few other folks, probably Ardmore wouldn't be as well-known as it is and Ardmore is one of Oklahoma's key technology cities. Isn't that right?

>> Yes, it is. We have a lot of technology. They're primarily with The Samuel Roberts Noble Foundation. But as we're talking about since yesterday, Amethyst Research Incorporated is also located there.

>> We will let you tell a little bit about what they do in just a minute.

>> Sure.

>> I promised everyone a minute ago that I'd talk a little bit about--let me--I wanna give one example. And the one that comes to mind is--it may not even be the best but it's a good example. Back about 2003, you know, we had a little barge coming up the Arkansas River and knocked down a bridge and 14 people were thrown off into the Arkansas River and of course that was a tragedy. But someone had to rebuild that bridge and a company out of Stillwater got together and got part of the contract. One of the things they did was they used sensor technology that was

developed in Stillwater Oklahoma and they were able to determine because, keep in mind here, they were in a hurry. Speed was of the essence because all that I-40 traffic was put on the secondary highways on both sides of I-40 which put a lot of pressure on highways that weren't designed to handle that much traffic and on communities that weren't designed to handle that much traffic. And so, it was a really a problem and so that they wanted to rebuild that bridge very quickly but they also had to be concerned about safety. And one of things they did, they used sensors that were embedded in the concrete that were--that allowed the engineers and the people who were rebuilding the road and the bridge to determine when the concrete was cured to the point where it could withhold weights. And by using that technology, sensor technology, they were able to build that bridge 48 days quicker than they would have otherwise. Which saved a lot of money; they got some extra money for the people who did the work on the bridge. They were rewarded for getting it done, you know, ahead of schedule. And plus it took a lot off the pressure of those communities around the Arkansas River in I-40. That's one example. I'll give lots of them. I'm going back to you. Let's talk about Amethyst.

>> Okay. Well Amethyst research primarily deals with what's commonly known as night vision and the sensors are involved in that. They have a lot of defense contracts. When they first came to Ardmore, they had three employees and now they're over 20 employees and 11 of those are Ph.D. So, it's

>> Quality jobs.

>> Quality jobs. Exactly! And you know, highly educated workforce and you know, one of the things that Amethyst has done for Ardmore--and other companies have done this as well, is a lot of people have the misconception that if you're in the rural areas, you know, away from a metropolitan area or away from a major research institutions or major research university that you really don't have the chance to get those types of jobs and those types of companies. And Amethyst, The Samuel Roberts Noble Foundation and other companies, not just in Ardmore but in other cities in Oklahoma are really proving that wrong.

>> Absolutely! A good example--let's talk about the Sensor Summit. Give me a little history of the Sensor Summit. What's all about? Who's here and what you expected to accomplish?

>> Sure. Really these all boils down to--sensor is a very new industry and I think in your introduction, you hit it off really well. You say the words sensor and everybody is, "What are you talking about?"

>> Right.

>> "How does this implicate us?" But in Oklahoma, it transcends so many different industries. Sensors are highly involved in the aviation industry, oil and gas, you know, the energy industry, defense, health, biomedical, bio-agriculture. And so, those are primary targets of Oklahoma. Even people in the industry don't know--what, it exist. And so, we put together an alliance. So these comprise of people in the research universities. We have people from Oklahoma and the University of Oklahoma and Oklahoma State University here. We have a lot of communities involved, Ponca City, Stillwater, Ardmore, Norman. Other communities are trying to get involved in this. Then we also have sensor companies, you know, the private sector. We're really trying to make the Sensor Alliance driven by private companies and giving them a resource that can really help them both promote the industry in the state and help them be more successful and then there are also some service providers. OCAST is one that's here, i2E, you know, other

companies along those lines. But, as far as a history, we have been putting this together for about a year. Trying to get the various aspects--every aspect really related to the sensor industry. It comes down to the communities and research institutions and the private companies but even sensor companies. You know, we talked about aviation. I think our air force base is great example of that.

>> Sure.

>> I mentioned The Samuel Roberts Noble Foundation. Sensors can actually be put in animals such as cattle that can possibly regulate and determine when they're in cycle for breathing purposes which can speed up agriculture productions. So there are just so many applications that we haven't thought of. But anyway, we thought that this Sensors Summit would be a good way of trying to really promote the industry and moving the Sensor Alliance forward.

>> Do you have an overall feel of--in this particular industry when you talk about a number of companies and amount of employment that this industry is providing in Oklahoma, any rough figures or percentages?

>> We're just really getting on to that because there are people in companies that actually do sensor technology or use sensors in their production that don't really align themselves with it. So, it's really kind of a soft figure. Rich Helfrich will be on a little bit later to kind of talk exact numbers on that. But, that again, kind of goes back to the purpose of trying to help people identify that they are part of this industry.

>> But it's an industry that has a lot of potential for growth in the state.

>> Yes, it does. And really the sensor industry as a whole is a growth industry unlike some others where they've reached the maturity. The sensor industry is really growing so there's opportunity for Oklahoma to get in on the cutting edge on the beginning of the industry trends and really create a cluster. And that's what a lot of Sensor Summit, the Sensor Alliance is about. You know, Oklahoma as a whole doesn't have a large cluster where any one segment, whether it be Ardmore Stillwater, Ponca City or Tulsa can really promote themselves individually. So we're promoting ourselves as a whole.

>> Well sensor technology, you gotta look at it as kind of a smart technology. Kind of in the computer arena but not hardcore but still it is a smart technology.

>> It is a smart technology.

>> And so, with that change of technology because when you look at nanotechnology, how it's producing new microchip processing and all of that, it's gonna change your industry dramatically. That's the thing.

>> Yes, I do. If anybody thinks that you're not involved with sensors. Well, every time you start your car. There are sensors that are doing things with your engine and doing things with your transmission and doing things with your HVAC system that make a huge difference the way your car operates. Not only that. As you drive down the highways, you could go across the stream. You often see a little device out here that's picking up the rays from the sun and it's powering sensors that tell someone, somewhere probably at the U.S. geological survey where the Oklahoma geological survey that the stream is such a depth. And so you can go, you can collect information very quickly without having to send someone out to take a stick and measure the depth of the stream. It does it automatically. It does it constantly and so you have just so much

more information that's vital to you. So that you can make you and your computer, you can make decisions about giving warnings about what's getting ready to happen downstream.

>> Yes.

>> So there are all kinds of examples of things that are happening that--we pass by them every day and maybe we don't know what they are but they're there.

>> They are there. And so much of our safety in a lot of ways depends on it. You mentioned the bridge aspect. There are sensors in bridges to monitor the strength of that bridge so we don't have a bridge collapse.

>> Like I-35 up in Minneapolis a few years ago.

>> That's right. And just think of the sensors that are on an airplane when you just fly from here to Dallas or some other place in terms of life safety types--

>> Absolutely. Absolutely. Well, let's talk about where we're going. You've touched on it already talking about the cluster that you'd like to see develop. You talked about some of the communities and of course almost every community is involved. But the key communities are the ones you mentioned. And you mentioned the research universities, Norman, Stillwater. You mentioned two major metropolitan areas. But you also mentioned Ardmore town, Ponca City, lots going on out there.

>> Yes, with the--

>> And the university multispectral laboratories--

>> Absolutely. Absolutely, and so when we talk about this business, this industry, we're talking about businesses that are locating there, have located there, and those that will locate there.

>> That's right.

>> And so this is an economic development effort then.

>> It is an economic development effort and that's the way Ardmore sees it. I mean we look at Amethyst not only from the standpoint of--I mentioned how they had 3 jobs when they started and they are over 20 now, but more importantly, they are a magnet that we feel that we can attract other sensor-related companies. We are in the process of building a technology park right now and there's a potential for collaborations with Amethyst. They've already grown to the point that they're gonna be spinning off a new company. Again, it's just growth. Ponca City has a potential with UML. Norman has that potential. So it's really a catalyst that can promote other types of companies and even suppliers.

>> Right. You mentioned UML. Of course, the multispectral lab is involved with unmanned aerial systems and that's a big deal for Oklahoma now. Our governor has really focused on that of late and so there's a lot of attention being placed on unmanned aerial system. Talk about it, sensor-intensive activity when you have unmanned aerial vehicles out there being controlled from--by pilots halfway around the world, you can't do that without sensors.

>> That's right.

>> Because that's how the information is transferred, right?

>> Very much so. Yeah.

>> Aviation has been a big part of your community, Ardmore.

>> Yes, we have the Ardmore Air Park. We have an aviation company there that employs about 150 people.

>> How many? 150?

>> Yes.

>> Any community would want 150 employees. They want a company that employ that big. That has to have a tremendous impact on your community.

>> Yes, it does.

>> Yeah. Okay, what else is gonna happen today? We're gonna hear from who?

>> You're gonna hear from Rich Helfrich with Alameda Advisors. He's also a consultant with Amethyst Research. But he did--the Ardmore Development Authority and Amethyst Research cosponsored a study that was completed in December of 2010 and he's gonna talk to you about that. He's giving a presentation right now. But you're also gonna have Web Keogh with University Multispectral Laboratory. Dennis Altendorf with the Tulsa Metro Chamber. Dennis is an aviation expert and that's really why Dennis is involved in this from the aviation aspect.

>> If there's an aviation community in Oklahoma, Tulsa, probably is it with all the things going in there.

>> That's right. And then we're gonna have a [inaudible] private company. [Inaudible] talked to you to just in terms of why a small company in Oklahoma City would be interested in being part of the alliance.

>> Great. We're coming to you from the 2011 Sensor Summit in Oklahoma City. We've got a lot more to talk about trying not to make [inaudible] for you, when we return on Oklahoma Innovation.

[Music]

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[Music]

>> We appreciate you joining us this week on *Oklahoma Innovations*. You know, we always say on this program, you're never going to know what we present to you each week and this week, we are talking about sensor technology development, manufacturing in Oklahoma. As we come to you from the 2011 Sensor Summit. This is a collaboration gathering of people in that industry sharing ideas on how they can grow this community within our state and from what we've got from the first interview. It sounds like it's a prospective--

>> Absolutely Gary. We have with us coming on is Dennis Altendorf. He is the Director of Aerospace Strategy for the Tulsa Metro Chamber and he lives in Edmond but he works actually all over the state probably and--the northeast. But he has--he has quite a--quite a history behind him as for aerospace, what have you, give that history real quick, Dennis if you would.

>> Okay, I'm a retired military officer. I spent 28 years in the Air Force, a little over 28 years and that time was pretty well split between working in logistics and operations. My operations assignments were basically with the [inaudible] secondary control wing on board the airborne warning and control aircraft, AWACS.

>>We know in Oklahoma's AWACS is a Boeing 707 has a big disc on top of that so it makes it little unusual and you're a pilot, right?

>> No, I was a Battle Manager.

>> Battle Manager?

>> I was the--I was the mission crew commander. And you know when I retired from the Air Force at Tinker I was the Chief of Staff for the 552nd Air Control Wing.

>> Do you have about 2500 hours flying AWACS?

>> I do.

>> Okay. Outstanding. Your--you came here today to talk with the folks here at the Sensor Summit about the opportunities within industrial sectors and we're talking about sensor technologies so give us a kind of pre overview of what that's all about.

>> Well as, you know, what we got, you know, from Oklahoma's perspective, this is kind of emerging industry. We don't really know what we have in the state although since our industry, when you sit there and look at the global affiliations out there, you know, it's--it's a big market. And we're trying to look into, "Where can Oklahoma fit into that industry market," and again, both research and development manufacturing and you know customers and we have customers and again, having come out of the aerospace business you know sensors are a big part of the aerospace business especially nowadays with the unmanned aerial systems--unmanned systems.

>> Yeah that's just coming into its own. Yeah.

>> It's sensor laden and you know so there are some opportunities that we're hoping to capitalize on and capture here in Oklahoma.

>> Okay, you talked about those--those opportunities of course you represent the city of Tulsa through the Tulsa Metro Chamber and work throughout Northeastern Oklahoma, kind of give us an overview of where you see sensor technology being developed most specifically in your area.

>> Well, I think you know one of the major areas again is aerospace. Tulsa is noted for its commercial military or main industry repair and overhaul and operation--

>> Big [inaudible] airlines specifically.

>>Largest facility in the world and that we've got a number of small [inaudible] overhaul, operations [inaudible] international. You got some avionics companies there, again--

>> NORDAM an Oklahoma-grown company--

>> Spirit--

>> Spirit--Spirit Aero Systems and again, you know when you sit there and you look at the sensor world, you know, especially today, you know, everything you touch. You know sensors are in everything.

>> Right.

>> And you know, if you sit down and think you know gee whiz, you turn your car on and you look at the sensors that pop up and--and give you the--you know the--the readings on.

>> Just look at your dashboard--

>> That's exactly right. It's tell you and you know, you look at the medical--medical aspects. You look at weather aspects, you know, just recently with the seismographic problems we've had with earthquakes, you know--

>> Oh we had earthquakes here?

>> So I've been told. I only felt one. I'm not sure I even felt that--well I only--I only felt one too but I've heard a lot about the others and you're right. Well you talk about aerospace you know, sensors are used extensively not only in the operations that are involved with aviation and aerospace but also with building of the aircraft. You know, we've gone pretty much from metals back to or down to we're using composites now.

>> Absolutely.

>> And they're lighter, stronger. They give us a lot of advantages and--but when you're dealing with composites you're dealing with the need to--to be concerned about the curing process and you've got curing, you've got like we say, the sensors going to have or the composite materials are going to have to be laminated. You're going to have painting, you know, you've got the robotics associated with that. Again, a lot of the-the composites are or a lot of still hand, honed, expertise but they're still sensors are embedded in them. sensors are embedded in almost every piece of machinery on an aircraft, engines, tons of sensors.

>> That brings us back to this summit. That's why we're here, is to make sure Oklahoma is prepared to do everything we can do to bring as much of that industry into the state and to develop it right here in Oklahoma, right?

>> That's--that's the intent. Again, like I say, this is the first summit and it's really a networking opportunity because again, we're trying to cast the net out there to see exactly what does Oklahoma have there because there are counties out there that we're not sure are out there and they're out there and they're doing things. They're manufacturing, they're research and development aspects and we're not aware of them. And so what we're trying to do is through this networking opportunity, you know, word of mouth, you know you've got companies that are manufacturing that have customers in Oklahoma and we're trying to identify those and look at you know. Where can we as a state help grow this industry?

>> Yeah and this is a natural progression, the point where we are now because there is sensor activity, lots of it happening in Oklahoma. It has been for some years now.

>> Absolutely.

>> And so--

>> If you look at the oil and gas industry and they've been primary players in the sensor industry and again like I say, the aerospace industry is--is also. But again we just don't have the [inaudible].

>> And--and the forward-looking people like yourself who are sitting here at this point saying "all right it's here we need to figure out just exactly where Oklahoma is and that's kind of what? Why are we having this meeting?"

>> That's exactly right.

>> Well it's obvious with a summit like this as being the first one and as we've--as long as we've been doing this show 16 years now. It's obvious that as you have these events annually, you're going to get more people involved, word of mouth, social networking, emailing, the marketing of the summit will draw more people in and may surprise you what will come out of the water with the companies that didn't know existed as you just talked about.

>> That is absolutely right. We had a similar and--like I say, we did this about three and a half years ago with unmanned aerial systems.

>> Right--

>> Here we go.

>> You know we had no clue what was in Oklahoma.

>> Dennis, we appreciate you being a guest on this part of our show. We'll come back and talk on the back half of our show from the 2011 Sensor Summit on *Oklahoma Innovations*.

[Music]

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[Music]

>> *Oklahoma Innovations* is about science technology. It's about product development. It's about education. It's about finance. Anything that's science and technology related we talk about on this program and that we are at a new conference. The first one of its kind in Oklahoma to our knowledge anyway and it's called the 2011 Sensor Summit. Now if you just joined us, this conference is about people who are involved in the innovation and manufacturing of sensors. And when you think about sensors in your vehicle, you think about sensors in your home. You think about sensors in an aircraft. Those are the kinds of things that we are talking about and Steve, I'll tell you what the last couple of guests have given us a pretty good picture of--

>> Absolutely you're right.

>> You know the possibilities in Oklahoma.

>> Yeah, you mentioned all those things that Oklahoma is about but this week Oklahoma is about sensors and we have with us Rich Helfrich who is with Alameda Advisors.

>> Who has been on our show before.

>> He's been on the program before and he's gonna talk--he did a study that's why he is here and he's gonna have some information for us in just a minute but for those of you who have may missed Rich the last time he was on, we're gonna let him give a little--tell a little bit about himself and how he came to be involved with Alameda Advisors and Rich, welcome to *Oklahoma Innovations*.

>> Thank you very much. Yes, I've--I've been involved with Oklahoma now for several years. Actually I first learned about activities in Oklahoma about 4 or 5 years ago from your former mayor in Tulsa

>> Yeah.

>> Kathy

>> Kathy Taylor,

>> Taylor yes.

>> Yes.

>> Let's stop and think for a minute, Kathy Taylor used to be secretary of commerce for the state of Oklahoma.

>> Oh, okay. I--when I knew she was mayor and--and she encouraged me to come to Oklahoma and check out what was happening here. And then I was also connected into a company called

Amethyst through some connections I had. I was on a committee at the National Science Foundation in Washington and--

>> And Amethyst is down in Ardmore, Oklahoma.

>> Yes. And--and so between those 2 connections, I started getting involved with Oklahoma and my personal background is--covers business, technology, and finance. I have been an entrepreneur. Serial entrepreneur, I started several companies. Some of which are successful, some are not. I can tell you I learned a lot more about the fail--during the failure.

>> Sure.

>> Than I learned from the successes.

>> We learn from our failures don't we?

>> We sure do and in fact you know, serial entrepreneurs, I can tell you I was one of them. If you're successful on your first startup, the odds are something I've been told 93 to 96 percent, you're gonna fail on your second because you think you're god.

>> You think you know it all, don't you.

>> Yeah. Well, and then you know that's one of the things that--that we've discovered over the years is that people do much better as far as developing and creating as entrepreneurs when they have a chance to fail.

>> Absolutely.

>> Because you learn so much about what you did wrong.

>> Yes indeed.

>> Well, it's kind of like the old adage, boy if I was 25 again, I know what I know now.

>> We all say that.

>> Yes. Yeah.

>> You'd be Warren Buffet

>> That's right.

>> There you go.

>> Well Rich, you did a--you've--you've conducted a study of Oklahoma's--the Oklahoma sensor study, I believe was what it was called and you were commissioned by several groups I noticed we talked about earlier was part of the Oklahoma State University. The Ardmore economic or the Ardmore Development Authority was part of it and maybe a few others but you came up with some information that you presented today at the sensor summit.

>> Yes.

>> Give as an overview of what you found out?

>> Well, I--I found there's a very interesting mix of things going on here in Oklahoma and there is great technology mostly in the universities. There are some interesting startups that have interesting technologies. Some in the sensor space. There are some big industry activities going

on here but I've done business in a lot of states and a lot of countries around the world. Even--even central Asian countries and this is the most un-networked state I've--I've seen.

>> Okay. So we have some network building to do.

>> We have network building to do here and--and you have great customer communities. I found like having spent time in Singapore. What really makes a difference is connecting in with customers and Oklahoma has some terrific potential big customers in oil and gas in particular.

>> Right.

>> I mean you have some great companies here, very innovative companies. You also have smaller exploration companies here and the technology used is still quite primitive. It's actually not unusual in the oil and gas industry for--for land based oil and gas to remain primitive. The off shore stuff has gotten really, really advanced.

>> Right. Right.

>> They have bigger challenges getting into that water and finding where the oil is.

>> And so those guys use lots of sensors but the amount of sensors used on--on land-based oil and gas is quite low and yet recently there's been finds of you know--there's the Shell and--and Tarzan's oil and gas and that is much more complex and is gonna require huge amounts of sensors to be efficient.

>> Okay.

>> And--and even--even putting in a modest amount of sensors can increase the recovery rate and the total recovered percentage. And it doesn't take very many extra barrels of oil or million cubic feet of gas to pay for sensors many times over.

>> Absolutely.

>> And so there's great opportunities here that the oil and gas industry though tends not to understand what's possible and how it's done.

>> They're focused on--on getting the oil out and selling it.

>> Exactly. And on the other hand, like the university researchers that are doing some really terrific sensors and I've seen quite a bit of here at OU, OSU, and TU. They're doing some very good work but they--they really aren't connected with the oil and gas industry. I tried to encourage people to invite oil and gas executives here today but so far we haven't found a connection into them.

>> Well, you mentioned that--that's one of our short comings and that's the area where we need to improve. When you've addressed the group a little earlier, what kind of reaction did you get from--on that subject?

>> They were very interested to hear that.

>> I bet some ears perked up when you said.

>> Yes.

>> Here's where you're not hitting the mark, right?

>> Right. And--and unfortunately on the sensor side, the sensor companies I talked to even--even one company here. Geophysical research that actually makes oil and gas sensors is part of it an ecosystem chain but they don't even connect directly into your local industry here.

>> We will bring you back.

>> Show us how to do that, right?

>> Yeah. I mean it's--it's amazing. You know, they're not very many miles away.

>> Yeah. In your search, what do you--

>> Very good work but they--they really aren't connected with the oil and gas industry. I tried to encourage people to invite oil and gas executives here today but so far we haven't found a connection into them.

>> Well, you mentioned that--that's one of our short comings and that's an area where we need to improve. When you addressed the group a little earlier

>> For medical advances in imaging--

[Inaudible Remark]

>> And you know, they needed to make a better prototype and talk to some end users to see what it was like.

[Inaudible Remark]

>> Has in the sensor industry in general. Of course, we talked about oil and gas. We talked to recent--recently in a previous segment about aerospace. Give us just kind of a general consensus of what you've discovered with the potential that Oklahoma has in all areas when it comes to sensor activity?

>> Well, there are 3 big user bases in Oklahoma. One is oil and gas, the other is agriculture and ranching, and--and that is terrific. I was very, very impressed with the veterinary school at OSU that's--they've got some great activities going on there and if you start digging in, fortunately I have a background in--in physics, engineering, chemistry, and biology. I--I studied all of that in school and so I was able to ask some very good questions of these guys and--and found that, well like you know, what--what would you need for ranching to make a big difference? And they said, well we could use some sensors to tell if cows were pregnant very, very quickly after they became pregnant and I said well, have you talked to anybody in the engineering school or anybody [inaudible] about that? And they said, well no. We haven't talked to.

>> Those obvious things that you just did, why didn't they take the next step right?

>> Yeah. I mean, they need it. The engineering guys are doing some very interesting research. They're not even thinking about you know, veterinary applications.

>> Yeah. Sure.

>> But--but yet they are on the same campus.

>> Rich you just described something that we've recognized for many years. You know, we are very proud of our researchers in the state and they do such wonderful work. But often times they may not have any skills in marketing, they may not have any skills in attracting finance, they may not have any skills in knowing how they'll go to the next step and so that's one of the things

that some of our--our strategic partners do try to help them get over those barriers so that they can be more successful financially.

>> You--you're verifying exactly what--what we've seen.

>> What was the third category?

>> The third category was aerospace.

>> Aerospace, of course.

>> Yeah. Cause you have.

>> Yeah.

>> You have not only the aerospace repair and stuff, Tulsa and Tinkers doing a lot of upgrades. You know we have B-52s here in the U.S. and with the federal budget, we're gonna be replacing them with B2s anytime soon.

>> Right.

>> So those things are gonna be--have to be retrofitted over and over again.

>> I'll tell you what, we--I hate to cut you short but we're coming up on a break. This is really good stuff.

>> We need to have him back--

>> We could do a whole hour, yeah on his research and what he has uncovered in Oklahoma. We've got to take a break. We'll come back with our last segment when we return on *Oklahoma Innovations*.

[Music]

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>> Well if you've been listening by now, you're probably asking yourself, what is going on with sensors in Oklahoma? We'll see with our next guest is. He's probably gonna give us a better picture of that right?

>> That's exactly right Gary. We have with us Web Keogh who is with the University Multispectral Lab.

>> Now that's a mouthful. But we'll let him explain what that's all about. Web, you're gonna be talking here with the folks at the 2011 Sensor Summit about what is going on with sensors in Oklahoma? And we've had a little taste of that with some of our previous guests but I think you're gonna probably bring all that together with us for us and before we do it, we want to know who Web Keogh is? How did you become involved with this--with this project with UML at OSU?

>> Well, first of all it's a pleasure being with here with you today. The UML was actually started as a public private partnership with the State of Oklahoma through Oklahoma State University. My background is, I came from Los Alamos National Laboratory, worked with the Department of Defense and specifically United States Special Operations Command and so what we need to do is find a venue in order to bring end user requirements and merge those with the innovators specifically those innovators here at Oklahoma like at our research institutions like OSU and OU and TU.

>> Well, you will never say it but I'm gonna go ahead and say it we're very fortunate in Oklahoma to have you here to have attracted you from--from Los Alamos because if you're involved with Los Alamos you've got some experience in this field and I'm sure you're bringing that to bear at the University Multispectral Lab. What are you gonna be telling the folks here?

>> Well, today what we're gonna discuss is what are the end-user requirements? What are those, where is that trend in sensor technology going? And so a lot of folks that look at sensor technology and we have sensors throughout our entire lives.

>> Sure.

>> You are surrounded by more sensors in a car that you ever wanna know about but they help keep us safe. They help keep our economy going. They help keep our lives going.

>> And they keep adding more.

>> And they keep adding more.

>> And of course the key thing with sensors and--and the trends that we are looking at, is they need to comes smaller, more powerful, and take up less energy.

>> Yeah.

>> So it's always this size, weight, and cube issue that you have going on.

>> So, so I suspect Oklahoma as it shakes out in comparison to other parts of both the country and world. But probably pretty well positioned although I am sure we can make improvements.

>> We are very well positioned and we are very well positioned to make an--an immediate impact to a global economy with our sensors. Obviously, Oklahoma has--we've got a great a number of capabilities and resources that come to bear. We are looking to grow those. We wanna add about 20 percent to the RND production of the state over the next 5 years that would equate to about 200 million dollars a year in RND revenue. A lot of that focused around sensors.

>> Now where would that money come from? I guess probably many sources.

>> That money comes from many sources. We target primarily the federal government for a lot of the work with UML. We do 90 percent of our work for the federal government. But obviously as you look at the--the declining federal budgets and the increasing needs at the state and local

level, we'll see some budgets come in from the states but we are also taping more into the commercial sector.

>> Private sector stuff.

>> Private sector absolutely. The way we work and the way we operate is we focus on the top one percent of the users. Those are the SOCOM folks. Special operations command folks. We know that the technologies that they are employing right now in 3 to 4 years will be highly sought within the commercial sector. So, as an--as the--as you go down, the pyramid as it were from SOCOM being the pointy end, you get into a much--much larger market and therefore an easier way to making sales for us.

>> What do you think our edge is in Oklahoma? What makes us competitive, or could make us competitive?

>> Well I would say that there are at least three thing that make us competitive. One, it's the people. We have a fantastic group of individuals here in the state that are highly technical, understand business, and understand the end-user's requirements. Second, it's our research institution. We have three fantastic research institutions through OSU, OU, and TU. They're producing a lot of innovation that can be directly applied to those end users' needs. And the last is, the fantastic--with the way the state approaches business. A very business friendly state and that helps new businesses grow.

>> We've become better at that I think, over the years, Oklahoma has, Oklahoma government has started looking some years ago at how could we foster business, how could we help small businesses be more successful, and you bring that up, do you not find that in other parts of the country? Is that pretty universal?

>> I think it's universal that all states are trying to do that. To improve that business setting but we have just unique combination right now with Governor Fallin in place. She understands business. She understands the interplay and she's really working hard in order to make this happen.

>> Will you bring up Governor Fallin, and that to me when I hear her name associated with the University Multispectral Lab, I always think of unmanned aerial systems. Now, give me, I'm probably off base on this, but just how much of the overall focus on at the Multispectral Lab is unmanned aerial systems?

>> Well, unmanned aerial systems is one of our four core competency and capabilities, and so it's representing between 25% or a third of our current business in our future.

>> Okay, let's tie-in sensors to unmanned aerial systems. We thought a little bit about it before, before you got on, but without sensors, unmanned aerial systems, well that absolutely have very little use for us with that.

>> Correct. The unmanned aerial systems and vehicles, it's a lot of fun to build platforms and that's where you see a lot of focus but you can have the coolest platform in the world but if it can't support the sensor package which is actually producing the information or the actual intelligence. Then you really have a great plane that's just flying around.

>> Absolutely. Now, let's bring it down to perspective, when you hear about unmanned aerial systems more specifically unmanned aerial vehicles, typically this, in this day and age you are hearing about things like the predator being used over in Afghanistan or in Iraq, but there are lots

of other uses that don't require such a huge platform but are used mostly for intelligence gathering, is that true?

>> That is very true and in fact one of our programs is actually been looking at how to make an unmanned aerial vehicle run more quiet. So that is more difficult to detect but also increasing the amount of payload that it can hold, so the number of sensor packages that can be put on, so.

>> So, we're getting there and these things are full--I mean, if you're going to control a vehicle in Afghanistan halfway around the world and you're in Missouri, in an Air Force base and you're the pilot. It takes some major sensor technology, because you don't know what you're doing if you can't see what that--the vehicle is seeing.

>> Absolutely, and that sensors. Those are sensors.

>> Okay.

>> The challenge for the universities to connect the bridge to commercialization, was, how are you guys doing that from a marketing stand point, I mean, what kind of goals are you have you set for yourselves and what kind of association, well this is a good example of kind of tapping into that bridge I guess.

>> Absolutely. The sensor alliance is a fantastic first step for doing that bridge. In this venue, we're bringing together the innovators and understanding what it is that they have to offer. Our next phase will be, no, we'll try focus on user conferences where we can bring end-users specifically from the Oklahoma industry to share with them what are things that keep them up at night and how can sensors, you know, play a role in fixing those problems.

>> Well, let me just point this out here. I don't want to be getting in your way here but our previous guest talked about from his studies the biggest challenge we had in Oklahoma is communications, connectivity, networking, yeah, the word was networking, and what you're talking about solves some of those issues.

>> We certainly hope so, that is our plan. It's to try to bridge that gap. In fact the entire business model for UML is to do that. It is to connect the end-users with the innovators and if we have a venue for doing that, we can translate. And quite honestly translation becomes the most important factor in commercialization.

>> Talk about the engineering talent available in this technology at the university. Can you elaborate a little bit about some of the integration of the student, research going on, and the growth there, talk about that, because that's our future.

>> That is absolutely our future and it is a, it's a wealth of resources that we can pull from the universities both at the faculty level as well as the student level. The importance of intern programs bringing interns into real world problems and issues where they can see the application of science, one that keeps them in science longer and helps them transition into a job faster. In my experience at Los Alamos National Laboratory, I run an educational program where we invited students to come in participate in mission critical research at the laboratory and then offer university level classes. We pooled folks. They came in, we had 10 percent of the students coming in said they were interested in a career in nuclear science. With that type of intern program we maintained over 90 percent of the students in nuclear science.

>> Really!

>> That's outstanding.

>> Wow!

>> That's happening to our neighbor in New Mexico, right?

>> That's was happening to our neighbor in New Mexico that's why I'm here in Oklahoma now cause I'm gonna bring that same type of program here.

>> Hey! That's good news we wanna hear that. So are you--have you started that process?

>> We have--we have sponsored over thirty interns so far with UML in the last 4 years and were--every year we seem to be doubling our numbers that are there so I think we'll probably have about another twenty interns this year.

>> But you can't beat real world experience when you tie it to the classroom. I mean this just and gives these people employment possibilities for the future as well as the hands-on experience of getting where they're going to school. This is outstanding stuff. We'll we've certainly learned a lot since we've been here at this 2011 Sensor Summit and people like you who are collaborating with those in the industry those that are in the innovation of sensors, commercialization. This being our first summit we'll be doing this probably on an annual or semiannual basis. To kinda bring you up to date as this sensor industry grows in Oklahoma. Steve we gotta get out of here.

>> We do.

>> And we thank you for listening and we'll talk to you next time on another edition of Oklahoma Science Radio Magazine, *Oklahoma Innovations*. Have a good week.

[Music]

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