

## Oklahoma Innovations Radio Show

Air Date: February 7 & 8, 2009

Guest: **Dan Bierly**, Zivko, and **Jason Tomlinson**, Department of Energy

[ 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 identifies and funds promising research that allows our state to compete in a global market economy from our own backyard. Each week you'll hear from some of the state's most gifted and talented scientists, inventors, entrepreneurs, manufacturers, and business leaders who all have one common goal: developing technology based economic growth for all of Oklahomans. Welcoming you to Oklahoma innovations are you hosts Gary Owen and Steve Paris.

>> Gary Owen: Welcome to Oklahoma Science Radio Magazine. Oklahoma Innovation's Gary Owen and Steve Paris, we are on the road this week. We're coming to you from Guthrie and the Guthrie Airport, and a company called Zivko Aeronautics. And Steve I love their position statement, we are flying on the edge.

>> Steve Paris: And they really truly are Gary. If you look at the aircraft they are working on, and that's not the only thing they work on. But if you look at some of the aircraft, the competitive aerobatic aircraft that if you ever go to an air show, you'll probably see some of their aircraft flying. These aircraft are extremely light with a very high powered, well 330 horsepower engine for the most part, and they're used competitively. But you're really not telling the story of Zivko if you talk just about the edge, because as important as that is and as many of those airplanes as they put out there for professionals to fly... their main direction anymore is working on federal government programs, with the military, with a lot of applications... some of which they can talk about, some of which they can't tell us. But we're gonna talk about that here in just a minute.

>> Gary Owen: And that's why you want to stay on the program, because you're gonna learn some things today. It's one of those wow - that's going on in Oklahoma too? So that's what's great about this show. We always learn some cool things.

>> Steve Paris: That's exactly right. And of course we're in Guthrie Oklahoma, as you mentioned earlier, and when you talk about a company like this located at the Guthrie, I think it's the Guthrie Edmond Airport, I'm not sure what the full name is. That's kind of a relatively new development too, but we're talking about economic development because several people work here, a lot of contract work comes out of this facility, and it goes all over the world... predominately it goes for military purposes and for things of that type of nature that we're gonna hear more about.

>> Gary Owen: We got to see some... airplanes today that, the Navy plane we saw was just really decked out to the hilt with all kinds of fascinating tools and equipment.

>> Steve Paris: It's got a lot of sensors and a lot of devices hanging off of it. It's not designed for speed.

>> Gary Owen: That's right... measure atmosphere.

>> Steve Paris: Do measurements in the atmosphere that will be used by different government facilities, but...

>> Gary Owen: Who are our guests today?

>> Steve Paris: Our guests today, we've got Dan Bierly. He's in charge of sales, but I know he does a lot more than that. We're gonna introduce Dan here in just a minute. We also have Jason Tomlinson who's a scientist and he is kind of home alone here... he's not really from here but we'll let him explain how he got to be here in Guthrie with Zivko, but first we're gonna ask Dan, Dan Bierly, to... welcome to... it's Bierly? Thank you for correcting me on that. Dan Bierly... yeah, you ought to see what I call other people. [ laughter ] We're so glad to have you on the show and I apologize for messing up your name.

>> Dan Bierly: Not a problem, it's pretty common.

>> Steve Paris: Well, okay, but we want you to tell us a little bit about Zivko Aeronautics and what your role is, and just how you came to be here.

>> Dan Bierly: Well Zivko Aeronautics, the short version of the story... the company was started in 1988 and was originally based in North Oklahoma City and then a few years later... they moved up to Guthrie. One of the reasons was it's a quiet airport where we could work on things and have a nice quiet area to... to not necessarily work on secret projects, but we wouldn't be interrupted and be bothered by large amounts of traffic.

>> Steve Paris: Allows you to do your job much more effectively right?

>> Dan Bierly: Absolutely. One of the... and basically the business... one of the premises the business was started on was the aerobatic aircraft that's really the place where we got started. But during that time the aerobatic aircraft has been, has gone through updates and modifications and changes to be, what we consider, one of the world's top aerobatic aircraft. I believe it's won 7 national aerobatic championships in the unlimited category. Some of our pilots have won gold medals at world contests, flying the Edge. And so it's really grown to be a world dominant airplane, and then also in the last 4 years or so, the Red Bull air racing world series has really exploded on the scene. There's 8 to 10 races a year, that's incredibly popular in Europe. It's not uncommon in Europe to have a million people show up to a race.

>> Steve Paris: Wow.

>> Dan Bierly: And in this past season, 10 of the 12 competitors were flying our airplane and we've won in the last 3 years, the Edge 540 has won every race I believe, except for 2.

>> Steve Paris: Really? You just had off days there. Is that right?

>> Dan Bierly: Yeah, they were at end of the seasons, the guys were tired I suppose.

>> Steven Paris: Oh okay, we'll make those excuses for them. But that's phenomenal to win that many races in an aircraft built in Guthrie Oklahoma.

>> Dan Bierly: Absolutely.

>> Steve Paris: And let's make... let's clarify that. You don't have a manufacturing facility up here that just kicks out one airplane after another like on an assembly line, this is by demand and in other words people call you up, I want to buy one.

>> Dan Bierly: Yes.

>> Steve Paris: And you build them on a demand basis?

>> Dan Bierly: Yes, they are... each one custom made to order. There is a lot of different options that are pilot based - how they like their airplane or how they want this done, and so being that it's not just a constant assembly process, we have the ability to tweak the airplane and make some modifications, particularly with the Red Bull racers. Each guy has his own ideas on how he's gonna make the airplane, how he's gonna make the airplane fly faster.

>> Gary Owen: Now you gave us a tour of your facility today and it's... sometimes this is when we wish this show was television, because you have quite a facility here. How many people do you employ?

>> Dan Bierly: Currently I believe we're at 24.

>> Gary Owen: Wow. Now this is one of those facilities, listeners, where you talk about precision design and it's from the engineering of the layout to the finished product, and it's all done right on sight.

>> Dan Bierly: Yeah... the Edge aircraft was completely designed in house, it's design fabricated with pretty much the exception of the landing gear, propeller, and engine. It's all done and fabricated here.

>> Gary Owen: I want to tell our listeners, some people like to go to websites while they're listening to the show. Your website is?

>> Dan Bierly: [www.zivko](http://www.zivko) - z as in zebra, i as in Victor, k o dot com.

>> Gary Owen: Okay.

>> Steve Paris: Very interesting website, you need to go look at it. We have another guest, do we not Gary? We have a little time here, we're gonna go ahead and introduce Jason Tomlinson. He's a scientist and you came here by way of the Pacific Northwest? Is that right?

>> Jason Tomlinson: That's correct, Northwest National Laboratory.

>> Gary Owen: There you go.

>> Jason Tomlinson: And we're all here doing some research in the area, doing measurements of clouds and the atmosphere itself. And the reason why we're out here is actually really nice relationship that Zivko has actually with the Navy, more specifically the Navy postgraduate school. I'm from the Department of Energy and we actually lease the aircraft from the Navy postgraduate school, it's a Twin Otter aircraft and but Zivko's actually the people doing the maintenance on the aircraft. So they're allowing us to store the aircraft here while we're doing our research flights, and they have the crew out here to work on it and everything like that, so it's a pretty nice business relationship here.

>> Steve Paris: There you go, it's an interesting aircraft. We just toured it and as I mentioned earlier, it's just bristling with all kinds of sensors and devices that take measurements, and if you look at it it's quite a bit bigger than a general aviation aircraft but it's not as big as a lot of other aircraft, and it's a slow flyer right?

>> Jason Tomlinson: Yeah it's really unique in that aspect and that's one reason why we really like to use it for atmospheric research, is because it does fly slow. And so when we're trying to

make measurements of what's going on inside of a cloud, you actually can spend more time inside that cloud than what you normally would be able to do with a standard aircraft.

>> Steve Paris: Right, it's designed that way. There's so many things that Zivko's involved in. Let's kind of get a rundown, and Dan I guess probably you'd be the best person to do that. Just give us kind of a quick overview of the different projects you all are working on right now.

>> Dan Bierly: Sure, we have a tendency to talk about the Edge a lot because that's the flashy part, that's the exciting, the fun part of the business. But actually we have quite a diverse... line of products that we do and one of the things that's really been... the part of this that's growing the most for us has been instrument enclosures. And it kind of ties with the Twin Otter that's here as well. One of the main unmanned aerial vehicles being used by the Airforce is the General Atomics Predator, and we have set of pods that are designed to fly on that predator. And these pods... most of the sensors and the companies that are putting payloads on this airplane, they make payloads. They make electronic equipment, whether it be a radar or some sort of electronic warfare device, and what... but they're not an aircraft company and so they come to us, we're not competition, we don't do electronic payloads. They can come to us and say we have this payload that we want to fly on an airplane, do you have something that will fit in that we can put on the Predator or can we make a custom pod? And we've done pods everywhere from 8 inch diameter all the way up to a 32 inch diameter that's 12 feet long to fly on the different Predator models. And again, right now that's a... I believe this year the Air Force for the first time is going to be purchasing more unmanned aircraft than manned aircraft.

>> Steve Paris: Really?

>> Dan Bierly: Yes. It's really a big push and is towards the unmanned aircraft.

>> Steve Paris: Sorry out there all you pilots, it's getting tougher and tougher to find a job right? [ laughter ] Well that's fascinating and I know you have to design pods or different devices that have to operate in high speed conditions and foul weather conditions, all kinds of atmospheric conditions that are not conducive to just a day in the park right?

>> Dan Bierly: Yeah, these aren't... it's not, it's something that the military, they need it to go when it needs to go, so whether it be the rain, we've got water separators in the air so that it can get airflow, keep everything cool without getting all the equipment wet. And then all part of the design in the design process, we've got... our engineers work with the customer to find out what their requirements are as far as speeds, loading, how much stress it needs to withstand, those are all things that go into the design process that the customer works with, with us to make sure that it meets their needs.

>> Steve Paris: Is there much competition out there with what you all do in that respect?

>> Dan Bierly: There are a few companies that do instrument enclosures. As far as I know, most of them are doing them out of aluminum and that are much heavier than what we do, and we have the few line of pods that are approved to fly on the General Atomic Predator, so that's been very helpful. We've had a really nice relationship with General Atomics. They're so busy making airplanes that they don't want to... that they don't have time to work on pods so they send us the customers that they need do.

>> Gary Owen: Great, we gotta take a little break. We'll come back from Zivko Aeronautics on Oklahoma Innovations.

[ Music ]

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[ Music ]

>> Gary Owen: Oklahoma Innovations is on the road this week in Guthrie Oklahoma, and we're coming to you from a company called Zivko Aeronautics, which is located out at the Guthrie Airport, and or Guthrie Edmond Airport, excuse me I need to get that right. Anyway what I want to tell you if you've just joined us, Zivko is an advanced composite prototyping and design facility. They specialize in air vehicles. Now this is what I want to plug here. This is a woman-owned Oklahoma based company. It was founded in 1987 by William and Judith Zivko, and the company's basically designed to provide advanced composite design and fabrication at a reasonable cost to the general market. Now the last segment we were talking about the Edge 540 which is an aerobatics plane, and over the history as we go into the program, you're gonna learn that that's not all that they do or have done. Got some interesting trivia stuff here, so we'll pass that on when we have more time. Steve?

>> Steve Paris: That's exactly right Gary, that may be the most visible thing they do to the outside public, but that's not the only thing they do. And one of those many, many things that Zivko is all about has to do with working with the Naval postgraduate school. Now I don't have a clue what that means, but I'll bet Dan can tell us.

>> Dan Bierly: We... the Naval postgraduate school based in Monterrey California, they operate 3 aircraft. It's a Twin Otter, it's a DeHavilland Twin Otter, it's the Navy designation as a UVA team. It's a twin engine turbo prop... medium sized airplane. It's not like an airliner size, but it's bigger than just what you normally see running around your local airport. And we provide their pilots and mechanics and the engineering support for their aircraft. The other 2 aircraft that they operate is highly modified Cessna 337's that they use. We put a larger engine on the back and put a payload nose on the front.

>> Gary Owen: The 337, aren't they Skymasters?

>> Dan Bierly: That's correct. Yeah, it's the Cessna Skymaster. It's normally a push pull twin engine airplane and what we do is put a larger engine on the back and put a large payload nose on the front, kind of a silly looking airplane but it serves the purpose of they do some science research with it, but then also they can simulate unmanned aircraft with that...

>> Gary Owen: If I may, if you'll remember Bat 21 the movie, that's the aircraft that was used by the military in Bat 21 if I'm not mistaken. That's a long time ago.

>> Dan Bierly: I haven't seen that one, so...

>> Gary Owen: Vietnam era, go ahead.

>> Dan Bierly: And so we provide their pilots and mechanics and their operational support, engineering support, and they operate that Twin Otter all over the world. At the end of 08 that airplane went all the way down to Chile and they did a 6 week long mission doing research, and often it's operated out of California, that's where they're based out of. It goes to Florida, it's been to Japan twice, Hawaii, they take it all over the world doing scientific research. Right now it's based here and it will be until the first of July. They're gonna be doing research in and around Northwest Oklahoma, and then Jason, he'll be able to share with you a little bit more about why they're here. But again, it's here... it's based at our facility because we provide their pilots and mechanics and their engineering support. That's what helped bring them here, but the reason they're in Oklahoma Jason can share with you a little better.

>> Steve Paris: Very good. Well that's a fascinating story. We want to hear more about this Jason. Tell us about what's going on?

>> Jason Tomlinson: Yeah, I guess I'll give a brief little history here what's going on. The Department of Energy actually has had quite a vested interest in Oklahoma since the early 90's. At the time point in 1992, they established the Atmospheric Radiation Program and the goal of that program is really to understand how humans are affecting the environment. They have a really vested interest in looking at clouds and how we're modifying clouds in the environment. Actually a lot of people probably don't realize that, but everything we do from driving our cars to our industrial processes puts particles in the air, gets into the clouds and modifies them. That program's been around since the early 90's and it's actually been one of the largest and most extensive climate research field sites in the world. And it's based just north of Lamont, west of Blackwell kind of in that area, north central Oklahoma. And so why we're here is I'm actually from the aerial vehicles program, it's a DOE sponsored program, and we're leasing this aircraft and we've outfitted it with a bunch of instruments, and we're making flights over that site.

>> Gary Owen: Boy is that an understatement - outfitted it with a bunch of instruments. [laughter] There's stuff sticking out all over that plane.

>> Steve Paris: It's bristling with all kinds of sensor equipment. So that activity is going on right here in Oklahoma, especially in the Northwest part. It's been going on for quite some time.

>> Jason Tomlinson: It has actually. It's contributed immensely to our understanding of how the earth works, especially in the climate system. And it's contributed immensely to helping these climate change models they work on, in approving them.

>> Gary Owen: Are you involved in collecting any of the data?

>> Jason Tomlinson: Actually my role mostly here is from the operations standpoint. I'm helping to run the flights, to manage the people, and to also manage the flight planning. We also have a chief scientist here, Andy Vogelmann, from... he's from Brookhaven National Laboratory out at Long Island. And he's mainly the brains behind the operation, I would call him that, he's the chief scientist on this project and he's overseeing what science has to be done and what type

of measurements need to be made.

>> Gary Owen: Now you made a comment while we were touring the facility, why Oklahoma is unique for this kind of research? Explain that to our listeners.

>> Jason Tomlinson: Yeah actually it is in some ways. Oklahoma kind of represents a large amount of the U. S. and has some huge cities in the U. S. but those might not cover a large amount of the landmass. And a large amount of the U. S. is a lot like Oklahoma. You have a decently large city, but it's not like a mega city by any means when you have a large city, it's decent size. So it does have some affect on the environment around it, though it's not massive. And it's still kind of rural around that big city, and so it does really help to represent the U. S. It gives us a really good understanding. And on top of it, it's a very diverse amount of weather occurs here as we all can notice this weekend with the freezing rain that was occurring. It's very diverse and that aspect gives us a chance to look at how the clouds and the atmosphere is behaving over a large range of different environments temperature wise.

>> Gary Owen: Yeah what you mentioned and Will Rogers is well known for stating. If you don't like the weather in Oklahoma, wait 5 minutes.

>> Jason Tomlinson: It's pretty much how it is! [laughter]

>> Gary Owen: And we have that here, and also we've got Zivko Aeronautics here. So that made a big difference, I suspect, in...

>> Jason Tomlinson: It helped immensely actually, especially the cost of the project. This is really unique to be able to do this type of research over 5 months. Typically when we do this type of research, it's over a period of just a month, maybe 6 weeks.

>> Gary Owen: We gotta take a break here gentlemen, we'll come back and talk from Zivko Aeronautics when we return on Oklahoma Innovations.

[ Music ]

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>> Gary Owen: We are talking about aeronautics today, and Zivko Aeronautics is where we are on the road in Guthrie Oklahoma at the Guthrie Edmond Regional Airport. Steve Paris and Gary Owen here trying to, well always try to bring you something fun and interesting in science and technology, and this is one of those that we both enjoy.

>> Steve Paris: Yes it is Gary, and you know this means a lot to the people in the Guthrie area and to central Oklahoma, to all of the state. When you have a company like Zivko Aeronautics that's getting contracts from around the country and working with major governmental agencies and doing some very good work, to help both the military standpoint and private sector and also... the agencies they service as far as meteorological concerns, and who test our air and things of that nature. You need a company like Zivko Aeronautics.

>> Gary Owen: But you know that's not all they've done.

>> Steve Paris: No that's the thing, I could keep talking and I could never finish and tell you everything they do because they're a very multifaceted company.

>> Gary Owen: Now they did a project several years ago for Francis Tuttle called Project Hope. It was a solar car and it was for a racing competition I guess. Did you know anything before you came aboard, did you know much about that?

>> Jason: Basically it was... the Francis Tuttle group there, they were wanting to enter this competition and they... they had a design in mind but they didn't have the composite fabrication capabilities in order to complete the project. And so with our assistance they were able to complete the project and have an operating car that they could then go on and compete with.

>> Gary Owen: Visually it looks like an airplane wing with a bubble top on top and solar panels on the top of it, if you were to see it. But you can actually go to the Zivko website and see a photo of it. It's very, very cool. Now one of the things that I want to talk to you about is this MWR radar truck. This is something that was totally not aircraft related but kind of weather related. So talk about that.

>> Jason: The MWR radar truck, it's a highly advanced storm chasing radar, is one of the uses for it which is obviously at the heart of most Oklahomans. There are people always watching the weather and especially in the spring, and that truck actually will be back here this spring to do some storm chasing and weather research. When it was first designed, the truck, it had a different payload box on the back where the people would operate... the operations box. It wasn't very user friendly, there was a lot of things it required the users to get out of the truck, run around and crank things up and masts and posts and... even the radar platform itself had to be operated outside the truck. And so what they did, they brought it to us and we designed a

completely new operations area in the back, moved as much as we possibly could inside there so they can raise the radar up, operate the radar, the different weather sensing masts have become automated. You don't have to get somebody out to crank them up, it all can be done from inside the truck.

>> Gary Owen: So was the hydraulics some of the... yeah okay.

>> Jason: A lot of what we did was taking what they had and just making it so much more user friendly, making it more capable because obviously the times they're operating this the most is in heavy downpour rain, when they're going places, and so then somebody has to run out and jump out and run around the truck, putting everything up getting soaking wet and then hop back in with electronic equipment and everything going on inside, It was just... basically what we did was just design to make it much more user friendly and that way it can be deployed much quicker. They can get data faster, and they can move much faster and get to the next place. Obviously because the storms are moving at a rapid pace, they can get to the next point much faster.

>> Gary Owen: James, did you ever see the truck?

>> Yeah, well no actually I have never seen it myself. I've not seen it. We actually use this... Department of Energy actually uses this truck. A few years ago back in 2007 we actually leased it out to collect some information for us... it was measuring the clouds over Oklahoma in really high detail, high res. It's a really amazing piece of equipment to have here.

>> You know, I love to look back at some of the projects that Zivko has worked on and one of them was part of the Naval postgraduate school we talked about earlier, but it was the STV, the Smart Towed Vehicle project, and it's not current right now. This was done some time ago. I suspect it's being used somewhere around the world. I don't know that, but I suspect that. Tell us a little bit about that project Dan, and what it entailed and what Zivko's role was in that?

>> Dan Bierly: Well to kind of give a little background, the Naval postgraduate school, they operate the Twin Otter and a lot of what they were doing was flying for hours and hours on end at 100 feet above the ocean. Well it's a lot of work for a crew because you can't use the autopilot, you've got them sitting there all the time, and then you have scientists wanting to measure lower. So they wanted to go maybe 50 feet, well you can't operate this airplane at 50 feet above the water, particularly for any amount of time. And so what the solution that was came up with was a smart towed vehicle, and what this allows is a dual layer sampling, there is about 3,000 feet of cable that's in a reeling system inside the aircraft, and this pod that has a small active wing on aboard, they can reel it out and it's about 1,000 feet below the aircraft. And the manned part of the aircraft is now at 1,000 feet, it's much less work on the pilots and the crew, they can use the autopilot, and then there's a radar altimeter that controls an autopilot on the smart towed vehicle, and they can set the altitude that they desire and we go as low as 25 or 30 feet. And so this... and it follows the waves and what this allows is to get that data right close, as close as possible to the ocean over large areas to find out what they're looking for, is how the ocean is interacting with the air in the formation of weather events. And then also it allows with the Twin Otter being at 1,000 feet, they can get the dual layer sampling and be able to see what's happening at 1,000 feet as well as right basically above the ocean surface. And in fact it's an ongoing project. That was actually developed under an SBIR.

>> Gary Owen: Yeah Small Business Innovation Research Project.

>> Dan Bierly: Yes, and since that time we've actually been awarded a follow on SBIR to work on the development of a self contained system so that the reeling system and the towed vehicle is all in one package so that it has the ability to fly on other aircraft than just the Twin Otter. Maybe we could put it on a C130 or on a wing pile on. It's just a pod system that we could just hook up and operate from a lot of different airplanes.

>> Steve Paris: Yeah and you kind of touched on this but let me just say, that one of the purposes of doing this is to get data from the ocean and the impact it has on the surrounding atmosphere, which is very advantageous information to have without sending a crew down so low that they might get smacked by a wave, right?

>> Dan Bierly: Yeah actually the pilots talk about there's just these rogue waves that's 10 foot swells out there and all of the sudden a 30 foot wave. So here at 50 feet or you're a little lower or something and something 30 feet comes at you, the pilot's talk about picking their feet up off the floor.

>> Gary Owen: I can imagine. Very dangerous situation, very fascinating story. One of the things I wanted to clear up, we've talked about the Guthrie Airport. Let's get the name straight. It's the Guthrie Edmond Regional Airport.

>> Steve Paris: I got it right this last time.

>> Gary Owen: You did well, I'm the one who messed it... and I knew better but I tell you what, both communities, the Guthrie Oklahoma and Edmond Oklahoma have gone together, working together, and developed this regional airport. Used to be just the Guthrie Airport, but they're working together now and there's been a lot of expansion out here over the last few years and one of them, or maybe several of them, involve Zivko Aeronautics, and you talk about your physical plant Dan, and what has come about as a result of that expansion?

>> Dan Bierly: Having been here on the airport, Zivko Aeronautics being on the airport for about 18 years now, we started with just one building with just a small office area and then the rest of it was workshop. During that time equipment has advanced tremendously, we've added on, we've had 4 different expansions to now where we're at about 25,000 square feet, our facility. During our last expansion we added some more equipment. We've recently got a... we now have 2 curing ovens and then also we added a CNC cutting table for material cutting. What that allows us, it speeds up the process, more accurately cutting out instead of the old style of setting out a pattern, tracing out a pattern, and cutting it with scissors. It's all done on the computer, you roll out the material, and it cuts out the parts for you.

>> Steve Paris: Fantastic. So you've had tremendous growth... in a short time?

>> Dan Bierly: Yeah and we've been really proud of the way it's grown and we've continued each year to do something to continue to expand and improve our facilities here.

>> Gary Owen: Technology, ain't it just amazing?

>> Steve Paris: Yes it is Gary.

>> Gary Owen: We are going to have to kind of wind up here just a little bit, but we've got one more segment and you know when you hear companies like this and you hear about how they keep reinventing themselves, and you say what's next, what's next on the horizon? And I don't even know if they know what that is yet, but we're gonna take a little break. We'll find out. Zivko Aeronautics in Guthrie, Oklahoma on Innovations.

[ Music ]

>> This is Oklahoma Innovations on the OCAST radio network.

>> Skin cancer is the most common form of cancer in the United States. But thanks to technology developed by an Oklahoma researcher, parents can enjoy a day at the pool without worrying about the sun damaging their children's skin. The latest breakthrough in sunscreen provides smoother coverage and superior protection against both UVA and UVB rays without harmful chemicals. This technology was developed in an Oklahoma lab by research funded through the Oklahoma Center for the Advancement of Science and Technology; improving lives, creating new products, that's what OCAST is all about. OCAST is looking for Oklahoma researchers serious about investigating new products, services, and processes that improve the quality of life and the economy for Oklahomans. For more information visit our website at [ocast.state.ok.us](http://ocast.state.ok.us). The scientific industry is shining bright for Oklahoma.

[ Music ]

>> Gary Owen: Gary Owen and Steve Paris coming to you from the Guthrie Edmond Regional Airport and a company called Zivko Aeronautics, our guests this week. Dan Bierly, who is with Zivko, and then we have Jason Tomlinson. I think I called him James a while ago. It's Jason Tomlinson and Jason is a scientist who is involved with the aerial vehicles program and he's working on some research with the Department of Energy. And before we get into the last segment of our interviews, I wanted to promote something coming up Steve, in February. It'll be February 24, that's on a Tuesday. It's the Oklahoma Unmanned Aerial Systems Summit and the Oklahoma state chamber is actually kind of sponsoring this event, and Lieutenant Governor Jerry Askins will be the lead off speaker at this summit, and this will be held February 24 at the Guthrie Golf and Country Club. It is open to the public, but to be a part of it you have to register. I think it's 30 dollars, and if you would like more information you can probably go to the Oklahoma State Chamber website which is basically [OKstatechamber.com](http://OKstatechamber.com) to get more information, and we hope to have more information before that event happens. Steve?

>> Steve Paris: That's exactly right Gary and thank you for bringing that up. I'd like to direct my next question, a series of questions, to Jason. I don't think we told you before, but Jason has degrees in physics and meteorology and he is a doctoral candidate, and he has, I'm gonna let him tell you the universities he went to. I do know he's finishing up his doctoral, or preparing to work on your doctoral thesis, at Texas A and M.

>> Jason Tomlinson: My undergraduate degree was at Valparaiso University, that's a smaller school in Northwest Indiana.

>> Steve Paris: Very good. And one of the things I always like to ask somebody who has knowledge of meteorology, it changes so dramatically and so rapidly and we feel like we're kind of the central point of meteorology here in Oklahoma because of our unique position. Tell us, what's the next big thing in meteorology?

>> Jason Tomlinson: Well that question really depends on the area of meteorology you're looking at. In our particular area, we're not working so much with the severe weather, I know that's what people in Oklahoma are really interested in because it impacts your life so much here. We're mostly interested in the climate change and the environment and looking a little further out than just... a couple of minutes away. And so the next big thing really we're looking at is developing new instruments. One thing we really need is faster instruments. We're always

asking that, everyone wants things faster. And there's always a catch 22, as you build things faster you also have to have accurate. So it is kind of a step wise progression here as you go through. And also the other thing we're looking at really is trying to make these instruments smaller. Really the future of a lot of these measurements is going towards unmanned aerial systems, or unmanned aerial vehicles, which as we talked about a minute ago, they're gonna have a summit on this year coming up in this area. And it's really where we're progressing. It's really where we're looking how to develop our instruments. They provide really unique capabilities. I mean they can stay in the air for a long time, longer than any person's gonna want to ever be up there. Some of these can be up 16, 20 hours sometimes. Some of the military ones especially, they can be up for a very long time.

>> Gary Owen: And they don't have to take breaks like people do.

>> Jason Tomlinson: They don't and you can put them in environments where a human wouldn't really want to be. And so in that sense it's nice. So you can make some really unique measurements with those instruments aboard those...

>> Gary Owen: You've picked a vocation where you're gonna be traveling all around the country at least, maybe around the world.

>> Jason Tomlinson: We do travel quite a bit. That is one thing that's happened, we have to go where the science is at. And a lot of times the science is occurring in some remote regions. Recently we were up in Alaska even, making measurements on the north slope, because that's where a lot of the effects of the climate change is being felt first. Most people hear a lot about recently the melting sea ice and just trying to understand what's going on up there. We really don't have a whole lot of measurements in that area of the world either. Not a lot of people live there.

>> Gary Owen: So we're right now in the process of gathering a lot of information.

>> Jason Tomlinson: We are doing that a lot and we're working to improve those climate models you often hear about on the news and that kind of stuff, that help predict the climate change or global warming.

>> Steve Paris: Very good.

>> Gary Owen: Well maybe you'll be able to help with your research, settle some of the debate going on about global warming and so forth so...

>> Steve Paris: Yeah and that is a debate. Depends on who you talk to. Let's look at Zivko Aeronautics. This is a company I've been following for some years now because we've been involved with this organization through OCAST, but Dan as you look down the road 5, 10 years down the road, I know it's difficult to really say exactly where you will be, but kind of give us a feel for your take on where this company is going and what you're going to be doing 5 years from now.

>> Dan Bierly: Well one of the things that's made Zivko Aeronautics so successful has been our ability to make course changes, try new things, have a vast knowledge and capability to do different things. And so a lot of times we don't know what's coming out 5, 10 years from now. A lot of times we're working with prime contractors such as Lockheed Martin, Northrop Grumman, and so we're just a small part of the puzzle of the big project that they're working on. And so my feeling is where we're... our goal as a company, what we're aiming for, is to continue

to grow our engineering side. We have an in house engineering staff. Our plan is to increase the number of engineers that we have on staff. We're really wanting to grow the instrument enclosure area for... as more and more unmanned aircraft are brought onboard, with the Airforce and the Navy using unmanned aircraft more and more, there's gonna be more and more need for these companies wanting to put their payloads on those aircraft and we were early on positioned to do those... to do the work and the fabrication of those payload enclosures. And so that's really the area we're wanting to focus on as well.

>> Gary Owen: Something I was impressed about the way that you... when you hire engineers, you don't just put them on the drawing boards. You put them actually in the plant and let them actually work hands on with the product. Talk about that.

>> Dan Bierly: An interesting thing is one of the things about our company is that the engineers, when they're brought in, they're put out in the shop for the first 2 to 4 months to really get a feel for how these parts are made and how it's done so that it can really help them later on when they're designing something, to really... to plan on the manufacturer ability of that part. An interesting fact about the company is that it is... we are a family owned company and all of us have worked out in the shop. My... Bill and Judy Zivko there, there son, he works here as a Vice President of Operations, Eric Zivko. Amy Sanderson is their daughter. She's the office manager now, but her and my wife Stacy, they both built the wing for a number of years on the aerobatic aircraft. So all of us have... and I built the tail for 2 years because we all worked out in the shop. We all know what it's like to be out there.

>> So you know how to get your hands in epoxy and of course you're dealing with things that are a lot further down the road than epoxy aren't you? You're dealing with some very advanced materials, and you've got to learn how to apply that and how to get the right mixture and all those things, and I'm sure your engineers... let me ask this question. As you look for not just engineers but all kinds of staff people, how do you figure out where these folks are? And how do you find them?

>> Dan Bierly: Sometimes that is difficult. Most of the time the engineers we would look at... first off I have a very close relationship with Oklahoma State University. We've worked with them quite a bit.

>> Just down the road?

>> Dan Bierly: Just down the road. We've teamed up with them on some projects and then also I work with them quite a bit with their unmanned aerial vehicle section. And so that area, often it's advertising in the newspaper or posting ads on the website for open employment, just different sources. Sometimes we use temp services, just depends on how desperate the need is at the time and what type of position we're looking to fill.

>> Gary Owen: Very good. I know it's challenging to keep a company running and to keep everything running the way it's supposed to run, and I was impressed going through your facility here. It's very clean. It's very well organized and I'm sure that comes from... for a lot of reasons and has to do with setting it up and working with people who understand the importance of keeping it organized. And so I'm sure you get a lot of foreign visitors in here, people from around the... not only around the country but from other parts of the world?

>> Dan Bierly: For the most part... particularly the aerobatic airplane and the Red Bull Races, we get visitors fairly regularly that are from Europe and Asia that are planning to visit and talk about their aircraft needs.

>> Gary Owen: Very good. Well if you would like to learn more about Zivko Aeronautics, great website, learned lots of interesting things, lots of photos to look at and see some of the projects they've been involved with. Just to basically [www.Zivko](http://www.Zivko.com), that's Z I V K O Aeronautics, dot com and it's a very, very informative website and Jason... you got any final thoughts about technology and science where you're going?

>> Jason Tomlinson: Well I want to give a little bit and talk briefly for the web address, so you'll find more information about our program. The name of the program is actually ARM, Atmospheric Recreation Measurement, and the website is [www.ARM.gov](http://www.ARM.gov).

>> Gary Owen: Very good.

>> Steve Paris: That's not Zivko, that's 6 o'clock Charlie saying it's about time to rock and roll out of here. We want to thank you for being such great hosts out here guys and nice airport, nice place to do business, and you're ever in the Guthrie area, you'll know Zivko. See you next week, Steve on Oklahoma Innovations. Bye bye.

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