

## Oklahoma Innovations Radio Show

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Guests: **Russ Howard**, Oklahoma City Air Logistics Center; **Dan Luton**, OCAST programs director

[ 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 sole focus is technology, its development, transfer, and commercialization. OCAST mission is to identify and fund promising research and technologies that 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, 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.

>> I would be the Owen.

>> And I would be the Paris.

>> That's right.

>> Hi, Gary.

>> Or as I say many times, he's the brains, I'm the voice, okay?

>> And I don't even know what the means.

>> I don't either, but it sounds good.

>> You bet.

[ Laughter ]

>> Hey, we've got, we've got a great show schedule for today. You know that?

>> Yeah, what are we gonna be talk about?

>> We're gonna be talking about CRADA. We're gonna be talking about the Oklahoma City Air Logistics Center. We're gonna be talking about Small Business Innovation Research and STEM and we've talked about that before, Science, Technology, Engineering & Math, and that's something our students need a lot more of, pardon me for any assumings with the preposition. But at any rate, we're gonna be talking about all of that on Oklahoma Innovations this week and you just hang around because we've got a gentleman by the name of Russ Howard who is an engineer. He's number one engineer, from what I've been told. He may argue with me about that, but at the Oklahoma City Air Logistics Center. All people notice Tinker Air Force Base, but the Air Logistics Center is a specific part of the Air Force Base. We're gonna hear more about that.

>> It's that huge building out there.

>> Yes it is.

>> Huge building.

>> And we also have Dan Luton, one of my colleagues at OCAST is with us today.

>> Oh, Dan. How are you doing, Dan?

>> I'm doing good, Gary. Glad to be here.

>> Nice to have--nice to have you back.

>> We're ready to talk to them in just a few minutes. We got a little of business to take care off.

>> What's going on at the world of OCAST?

>> Well, you know, we just had approval by our board of directors of about three million dollars worth of health research, 23 projects won. And when I say win, they have to compete and we use a system called peer review. It's kind of an internationally accepted method of determining how best to use public moneys in research.

>> We're talking about you, our listeners.

>> Yes. Yeah, it's your money. So its tax dollars that we use to fund some research projects that are close, in this case, that are very close to commercialization, that's one of the criteria, and probably the number one criteria when we tell our peer reviewers when they evaluate this applications is, it's got to be good science, it's got to be something that makes sense. And that's how we go about trying to find the best research projects. And unfortunately, we have a lot of research projects--well, I say unfortunately, it's a good thing. We have a lot of good qualified research projects; we just can't get through them a lot.

>> Well, that's the unfortunate part of it.

>> The good projects, they are waiting in the wings and they will, some many of them will apply later on, but we leave so many sitting on the table because of our limited resources and everybody understands limited resources, but we're very proud of those who won and those who applied and this is a very intensive process. There were a total of 122 applications.

>> Okay.

>> Yeah. And we were only able to get to 23. And many of the really good qualified research projects were left on the table.

>> And a lot of these applicants have applied more than once to compete, have they not?

>> Oh, of course, of course. We encourage those--especially those that get pretty close, we encourage them to, you know, work on their application for next time.

>> So what are their options, when--if they don't get any seed funding from OCAST, what are some of the other options they look at.

>> Well, I mean just because they don't get funding from us, it doesn't mean they can't apply for other fund--federal.

>> That's what I meant, yeah.

>> Federal support.

>> Just curiosity.

>> And sometimes private sectors support too. I mean they'll fund that but, you know, what we try to do is make sure that there is enough funding from the state level to where they can

compete because we've noticed over the years that when OCAST put some money forward on this projects, it's not unlikely for them to get even greater than matching funds from the National Institutes of Health, the National Science Foundation, you know, any number of organization.

>> And does OCAST help them in requiring some of those additional funds?

>> Well, only by giving them the cash. And of course, we don't give it to them in advance, we give it to them for a period of a contract that usually last two to three years. So, that's how that works.

>> So they don't get like one big flash of money.

>> No.

>> They just--they just to ask.

>> They gotta do the work then they'll get the money and that's kind of what's required of the way we do business because we're dealing with tax dollars.

>> I like that, though, that's good, yeah. You know that's, that's sounds like good business.

>> It's all understood before it begins so.

>> Absolutely.

>> It's a good contract.

>> In national news this week both in science and research, first of all, I gave you a picture this week, so I wish we were in television you could see this. The nation's first stair-climbing wheelchair hit the market with a big bang, but well it kinda went out with a little whimper and price was probably one of the big factors. Yeah, it was developed. Remember the Segway?

>> Yes I do.

>> Okay, Johnson & Johnson quietly sold the last iBOT this spring, shuttering manufacturing of a wheelchair that doctors had greeted five years ago as potentially revolutionary for the freedom of movement it promised, but failed to sell more than a few hundred a year. Earlier this month, a veteran who lost his legs in Iraq received the last know available iBOT, donated after its initial owner--after its initial owner died. Now iBOT users who fear their chairs wearing out are joining high profile inventor, Dean Kamen best known for his Segways in lobbying Congress for reimbursement changes that they hope could revive a technology that left the market, are you ready for this, 22,000 dollar price tag.

>> Oh, my gosh, wow.

>> But Medicare deemed was only worth about 6,000 dollars. Well, price wasn't the only factor in the iBOT demise, it's only a small fraction of the paralyzed--of the paralyzed. Even more candidates look like, hide this high-tech chairs required among other things, required that they use at least one arm and certain upper body control. So it wasn't just totally using thumbs and so forth, they have to have a little more mobility to use those wheelchairs. Researchers in Japan say they have identified a gene that appears to determine a cyclical, am I saying the right, cyclical.

>> Sounds good to me.

>> I think that's right, well, anyway.

>> Or maybe cyclical.

>> You have hair loss. People who know you know that you have hair loss.

>> Thank you, I appreciate that.

>> Right, right okay. Well, scientists say that they've determined the cyclical hair loss in mice, believe that may also be responsible for the same hair loss in people. This was a report published in the Proceedings of the National Academy of Sciences. The scientists described how they generated a line of mice that were lacking in the Sox21 gene.

>> Hmm.

>> You lack the Sox21 genes.

>> I want it.

>> The mice started to lose their fur from postnatal day 11 beginning at the head and progressing toward the tail region of the back. Between day 20 and 25, these mice eventually lost all of their body hair including the whiskers. Intriguingly, new hair regrowth was initiated a few days later but it was followed by renewed hair loss. Scientists say the gene is likely involved with the differentiation of stem cells that form the outer layer of the hair shaft. The scientists went on to examine human skin samples where they found evidence of this same gene. They confirmed that Sox21 is also expressed in the hair shaft cuticle in humans. So, there you are.

>> Yeah.

>> A lot of men.

>> Thanks for telling everybody that.

>> That's okay. Well, people who know you now understands. This dude is missing the Sox21.

>> Mom didn't know. She's not telling me that.

>> And now Steve, you swine, the most complete analysis yet of the new H1N1 swine flu virus shows it must have been circulating undetected for years.

>> Really.

>> Most likely in pigs according to researchers here recently. They said pigs are clearly a potential source of human pandemics, just what we wanted to know. Researchers confirmed odd mixture of human, pig, and bird genes in this new virus which has infected more than 11,000 people in 42 countries and of course numerous deaths. The World Health Organization is poised to declare a full pandemic of the virus which so far causes mostly mild disease in people. But the good news is--the good news is that scientists and our government, our government says that scientists are inching closer to a swine flu vaccine and the Center for Disease Control and Prevention hopes to deliver one or both to vaccine manufacturers by the end of next week so scientists can begin the month-long process of producing shots.

>> And I just want all of our friends with the Oklahoma Pork Council to remember it was Gary who gave that report not me.

>> And I don't believe, you know, that stuff.

>> There you go.

>> But you know that's what they say in the media, so what do we know. Okay, well let's see. In other news here, scientists recently unveiled, I'm sure you heard about this, well-preserved

fossilized remains found in Germany of a primate from 47 million years ago. How did they know that, 47 million years ago? That they may have been close to or could have been close relative of the common ancestor of monkeys, apes, and people. Yes, this is the one that they said was closely related to man or perhaps the missing link well. They say it is the most complete fossil primate ever found and a Norwegian paleontologist who led a team of scientists who analyzed the fossil in the past two years said it may resemble one of the earliest ancestors of humans but was not likely to have been a direct ancestor.

>> Thank you for saying that.

>> Pretty good, I guess.

>> And even more, here's a good one for you. Scientists have long noticed a curious phenomenon among primates. But humans are the ones that get the devastating neurological disorder known as Alzheimer's disease, but their closest evolutionary cousins don't. Even more inexplicable, can't say it.

>> It's easy to say.

>> Yeah, is the fact that chimpanzees and other nonhuman primates' brains do not get clogged with the same protein plaques that are believed by many to cause the disease in humans. In other words, they can't figure out why apes don't get Alzheimer's, but we do.

>> Hopefully, they'll figure that out very soon.

>> I don't know. Steve has our innovations in history this week.

>> I do Gary, thank you. Joseph and Jacques Montgolfier made the first hot air balloon flight June 1st, 226 years ago. They were aloft for about 10 minutes. The first payphone went into operation on June 1, 1880 at New Haven, Connecticut. And the typewriter was first scribed in Scientific American Magazine on June 1st, in 1867. The first traffic light in the US city was installed June 3rd, 1914 in Cleveland, Ohio. And the giant 200-inch reflecting telescope at the Palomar Mountain Observatory in California was dedicated June 3rd, 61 years ago. I thought that was in Arizona. It's in California, okay. The hamburger grinder was invented June 3rd, 1685. And June honors the 136th anniversary of when 14-year-old immigrant Oscar Myer arrived in America from his native Bavaria. He was instrumental in the development of packaged meats. Also that little car that goes around that looks like a hotdog. And the animals are first tasted in America on June 5, 1876 at the Philadelphia Centennial Exhibition. And by the way, bananas are grown in South America and that's in America also. That's just a few of the remarkable science marvels for the month of June, Gary.

>> By the way one last science story here. Scientists say low levels of vitamin D may contribute to cancer. This is according to US researchers. The first event in cancer is lost of communication among cells due to among other things low vitamin D and calcium levels.

>> Do you believe that, they're saying? Well, you can read out more on this stuff and other stories I'm sure on the internet. We have got a great show lined up for you when we return on Oklahoma Innovations.

[ Music ]

>> It began more than 100 years ago, making buggy whips in the small rural community of Hobart, Oklahoma. Today, that same company is still in business turning out nearly 40 million

wheel and axle seals a year. That's a lot of change in 100 years. The Oklahoma Center for the Advancement of Science and Technology or OCAST in association with organizations like the Oklahoma Alliance for Manufacturing Excellence helps manufacturers across the state compete in a global economy while at the same time developing a technology-driven economy for Oklahoma communities. Armed with information, education, resources, and partnerships that improve manufacture, productivity, and profitability with cutting edge technologies, OCAST and its affiliates work hard for Oklahoma's technology-based economic development, investing, partnering, and promoting the development of science and technology. That's what OCAST is all about. For more information, call 866-265-2215. OCAST, whipping technology into shape, so Oklahoma manufacturers can seal up business.

>> Now in its 14th year, this is Oklahoma Innovations on the OCAST Radio Network.

[ Music ]

>> We have with us in studio this week our good friend, Dan Luton who is program director for OCAST and he has brought with him Russ Howard. Russ is with the Oklahoma City Air Logistics center at Tinker Air Force Base. That is a marvelous facility, lots of activities going on there. If you're out in the Del City/Midwest City area, you ever past by the Base and you see this great big building that says, Oklahoma City Logistics Center, you just passed in there.

>> Air Logistics Center, yeah.

>> You bet. Has a one tremendous history goes back to I guess around World War II. First time--it has a lot of first, one of those is first time a tornado was ever forecasted actually happened was at Tinker Air Force Base.

>> Now, that I didn't know.

>> Oh, yeah long time ago. You're just, you just a wealth of information.

>> Well, you got to know what's going on around you but we're sure glad to have Russ Howard with us and he is in charge of engineering at the Oklahoma City Air Logistics Center and you've been there about what, three years, Russ is that right.

>> That's correct, three years.

>> Well, let's hear a little bit about you because I mean you're relatively new to Oklahoma and you've told us already you're kinda lucky here, you and your wife.

>> We do, we love it. We live in Edmond and just enjoy living here, love the west. This is west to us. I'm from the Deep South, so this is west to us, but it's enough like the south. I knew I was safe at home when the state meal was country fried steak.

>> You got it.

>> Hmm, [inaudible] I'm in good shape. So we've been here three years. I started my career at Eglin Air Force Base in developmental test and evaluation. I did that for quite a few years. I've moved into the program development. I was the chief engineer on the AMRAAM missile which is an interesting job and went to DC briefly and had a tour and a college there, I remember by the Armed Forces, Industrial College of the Armed Forces. And then I came out here three years ago and I'm the Director of the Engineering and Technical Management. And we have about 160 folks that work in the directorate, but there is 1,200 engineers--

>> Wow!

>> That we take care of and as I tell people, we take care of engineers and engineering, but I don't wanna forget the scientists either, we take care of them too.

>> There you go. Now, where's home for you originally?

>> I grew up in Montgomery, Alabama.

>> Okay.

>> I went to school at Auburn and then later for masters at University of Florida.

>> Very good.

>> Probably should have admitted that.

>> Oh, that's okay. You're among friends.

>> That's right.

>> Well, we take all conversation on this show. As a matter of fact, we even have, this show is even aired in Wichita Falls, Texas. I don't know if you've been there or not. Now, we have friends in Texas and other parts of the country too. Now, that's a tremendous background. It brings us up to date to where you are today at the Oklahoma City Air Logistics Center. And I mentioned some things early on. I've mentioned the CRADA and Oklahoma and the Logistics Center and SBIR and all that. We're gonna get to all of that but let's start out with some of the facts and figures about the Oklahoma City Air Logistics Center at Tinker Air Force Base. It's the world's six largest maintenance repair and overall activity center and it's DOD's largest air logistics center and missile jet engine depot. We--I took a tour of not too long ago, and I understand there's about 24 or 25,000 jet engines that are worked on out there every years, that sound about right?

>> I think it's a little bit less than that.

>> Is it?

>> It's in the low hundreds.

>> Okay.

>> But we do components that go in the jet engines that are used and repair all over the world. We also generate aircraft out of there and do a lot of work for the other ALCs. Air force has two other ALCs, one at Robins Air Force Base in Georgia and one at Hill Air Force Base in Utah.

>> Yeah, we were introduced to the Hanger Queen, the one that have been there 13 months which is very unusual.

>> Yes.

>> Got some special problems and.

>> Right.

>> And mostly aircraft that are there three to four months and they're set off on their way for another four or five year, right.

>> And that's a challenge of an aging fleet. The KC-135 sometimes you're surprised.

>> Yes.

>> And sometimes you have to go build pieces to fix it.

>> Yeah.

>> And that's the ones that are there longest.

>> Do a little, there's a term for that it's.

>> Local manufacturing.

>> Local manufacturing and reverse engineering.

>> Reverse engineering, yes sir.

>> You bet.

>> Sometimes.

>> Okay, let's talk about the CRADA, the Memorandum of Understanding and that happened about a year ago, not quite a year ago, when you folks signed an agreement and we inked an agreement with you, through OCAST and it was not just through OCAST, it was for the state of Oklahoma.

>> Right.

>> It's very important thing to remember because that opens up some other things too that are available and kinda give us, you know, it's kinda young in the process, but give us, you have enough take on on where things are and what's happened since the agreements were signed.

>> Well, CRADA stands for Cooperative Research and Development Agreement and it is a legal agreement wherein the government can partner with industry and academia all matters of mutual interest and the way we use it is for technology that supports the ALC's mission.

>> Since the CRADA was put in place or actually the MOU was put in place last October, we've been working to develop specific projects and that's how it was designed to work. The MOU is kind of a framework under which we operate with--and incorporate freshman state and OCAST, and then since then, we've been working together with OCAST to develop specific projects that will be documented in statements of work and will become their own little legal agreements and we'll go out execute them together. And what comes out of the end, the intent is something where we've transferred technology from the federal government to industry.

>> There you go.

>> And then they can commercialize it and sell it but at the same time, they solve a problem that we have.

>> Yeah.

>> And we all benefit.

>> Yeah. And let's go, let's get down to the very basics on this because just in case there's somebody out there that doesn't understand. The military doesn't just design some stuff, they require an R&D community to put these things together to come up these ideas and maybe in many cases the Air Force or the different branches of the Department of Defense have some overarching concepts they think that, alright, if we had these, see if anybody can build it for us.

So there is a tremendous relationship that goes on between private sector, the industry, so to speak, and the military.

>> Absolutely, as industrial base and also our academic base is very important right from the start, right from the initial ideas as you're talking about, initial concepts that we flash out in laboratories and then we work together to transition those into programs and we buy them and build them and the contractor work for us, does a lot of that work. And then once they're fielded and be unsustained, it's a split and it's a roughly 50/50 split. The ALCs handle about half the work and private industry handles the bulk of the rest of it.

>> There you go. So it's a very beneficial relationship.

>> Absolutely.

>> We're coming up pretty close to the end of this segment. This is the shortest segment we have. By the way, Russ, when--when you talk about those relationships and as they go on, you as the chief engineer, you play a, and I don't know if it's the right term, but you play a major role in making sure that everything comes together the way it's supposed to happen, is that right?

>> Right. There's a concept in the Air Force called operational safety suitability and effectiveness. And it's our responsibility to make sure that every system that goes out there does what the war fighter intends for it to do, does it safely, and suitability means we can sustain overtime.

>> Russ Howard is our guest and we'll be talking with Dan Luton too from OCAST when we return on your science radio magazine, Oklahoma Innovations.

>> This is Oklahoma science radio magazine, Oklahoma Innovations, with Gary Owen and Steve Paris on the OCAST Radio Network.

[ Music ]

[ Birds Chirping ]

>> It's a scientific fact. Plants have a positive effect on our world, creating oxygen, beauty, and a healthier environment. Plants make all kinds of chemical compounds that affect human health. Scientists like those at the Noble Foundation, a biology research center in Ardmore, Oklahoma are examining how genetically enhanced plants can produce their own chemicals for greater potency requiring fewer manmade chemicals. The end result will provide for more effective medicines and vaccines. This genetic study holds promise for plants and crops that will be naturally resistant to bugs and disease. The Oklahoma Center for the Advancement of Science and Technology or OCAST invests in projects like this at the Noble Foundation to help Oklahoma scientists continue their quest for new discoveries and development of innovative technologies. Investing, partnering, and promoting Oklahoma science and technology, that's what OCAST is all about. For more information, call 866-265-2215 toll free. OCAST planting seeds that blossom into technology-based economic development for Oklahoma.

>> In 1987 the Oklahoma legislature created OCAST, the Oklahoma Center for the Advancement of Science and Technology. The goal was to provide necessary resources in building a science and technology pipeline, from research and development to commercialization. The result, a stronger business infrastructure that today continues to profit in overwhelming economic growth for our state. Since inception, OCAST has administered 118 million dollars in state appropriated funding and leveraged 12 dollars for every dollar spent. That

leverage represents more than 1.4 billion dollars invested in Oklahoma research. Whether it's providing seed capital for new innovative firms and their products, facilitating technology transfer between research laboratories and businesses, or sponsoring university and college intern partnerships, OCAST strategically implements programs and initiatives that continue to have a positive impact on the entire technology development pipeline. To learn more about OCAST, visit our website. Just type O-C-A-S-T in your web browser. The Oklahoma Center for the Advancement of Science and Technology, an investment in Oklahoma's future

>> Research and development, technology transfer and commercialization, creating high paying jobs in Oklahoma is what OCAST is all about. This is Oklahoma Innovations on the OCAST Radio Network.

[ Music ]

>> It is considered the world's sixth largest maintenance repair and overhaul activity and [inaudible] largest ALC and missile jet engine depot, employs 25,190 some employees with a 1.2 billion dollar payroll and has a 2.9 billion dollar economic impact in the metro area. Quite a-- quite a bit of stocks here for the Oklahoma City Air Logistics Center. Our guest is Russ Howard and Dan Luton standing by here with OCAST. Steve.

>> Yes, Dan, one of my colleagues. He is the director of programs at OCAST and was a very much a part of setting up the process of developing this CRADA, this MOU with the Air Logistic Centers, and Dan from your perspective, I mean it's only been here a short time since last fall but, how are we doing?

>> It's been great for us. This is part of OCAST ongoing program to help match make needs with technology capabilities that there exists in the state. Through this MOU the Air Logistics Center is able to tell us the kind of technology needs that they have and we can go out to our 6,000 plus clients that are researchers and R&D businesses and confine the capabilities to help answer some of those needs. So it's a great win-win situation.

>> Exactly. You know, whether we're there or not, whether the State of Oklahoma is there at-- the Air Logistics Center is gonna be there. I mean they've established that credibility but we appreciate the fact that we're part of this and that we can bring some of the state resources to bear, especially where they're needed and that's kind of the call of the Air Logistics Center, the staff there to determine okay, where can the State of Oklahoma play a role here and that's--

>> Absolutely.

>> We're here just--and that MOU actually gives us all that status so we can make that happen very quickly, right?

>> Right. Right. And it's the first time we've entered into a situation like this. Of course, we did it, as you said, for the State of Oklahoma but OCAST serves as the point of contact for that using our resources and also other partner organizations in the states so that we cover the entire state when we're going out to help solve of these needs.

>> You bet. Well Gary just gave some of the criteria. The State of Oklahoma has a--has very much of a vested interest in the health and well being of the Oklahoma City Air Logistics Center and we're proud to be a part of that. Let's talk out--well let's go back to our other guest who we-- when we finished while ago, we had not quite touched on some of the things that we do out there at the Air Logistics Center.

>> Let me just run through those briefly and then we'll ask you a question, Russ, about the-- about some of the projects that are in development have been since we signed the MOU. Capabilities, aircraft environmental, altitude chambers, temp chambers that's temperature chambers, ovens and furnaces, hydraulic test, pneumatics, structural and material test, technical imaging, infrared thermograph, high speed video, NDI various testing, PML, I don't even know what those mean, but I bet you can explain them. There you go, and PML measurement capability and chemical lab of oil analysis and air samples. All those are needed and I'm sure there's many more in the processes that go on at the Air Logistics Center. But you've got some new projects that are under way under this MOU. Talk to us about some of those if you will.

>> I'll be glad to. One of the things that we've been working on here recently with Dan and his folks was that we need a way to capture what our needs are and the areas of technology that we need to advance and match them with people who could answer those needs, provide solutions to us that are inside of the state. And so, one of the first CRADA is maybe a database that's being developed by a local business that we'll be able to mutually use, that will be outside the tinker information system. It will be--where everybody, the public can get to it and see what our needs are and propose solutions and that will allow them--I've talked a minute ago about putting the solutions together with needs, that match making is very important. And that's really where innovation comes from. It's when you got a problem and you got a solution and sometimes you didn't see it coming from that direction but it's better than anything you could have done on your own and that's exactly the kind of ideas and free thinking that we wanna promote.

>> Very good.

>> Bottom line here is what you guys are developing is more and more collaborative partnerships and developing new business opportunities and more employment opportunities for the state and depending on where those particular needs are required within their--there for specific needs. And I guess one of the things that maybe a little bit confusing to some of our listeners is what is the bottom line, what does that mean to us? As the average listener around here, will you talk about this coll--because some of this is like pretty high techs but what does that mean to a lay person? When you talk about these collaborations and these partnerships, what does that mean overall?

>> Well for all of us as taxpayers, it's a better use of our money because we put together better projects that deliver an end product more effectively and in less time that we would be able to do any other way. For our companies and our researchers, it builds their credibility and expands the work that they're able to do and be able to deliver actual real world needs to a real world situation. So that's something that you don't get otherwise without building this kind of collaborative efforts.

>> And obviously, these are towards the military applications?

>> Absolutely, and you know we're all here to defend our nation and there's only so many resources there to do it. So anytime that we can find a more efficient, effective, cheaper way to solve our problem, we all benefit--the taxpayers and the folks trying to defend us everyday.

>> Very good. Russ, we talked as we were walking in the studio this morning about shape engineering for advanced manufacturing?

>> Absolutely, and that is a technology that we really have to use sometime. You mentioned some of our older aircraft. There are times that we just have to go reverse engineer and design

something and build it as frequently better than new to go onboard an aircraft. And I also mentioned to you that there are times that we have parts that when we first designed the product when it was delivered to us were designed as throwaways. They wear out, you replace them. And some of these are quite expensive in jet engines in such. Well, there's technologies that come along everyday that now you can repair them and the airlines that developed some of these techniques. Well, we wanna take advantage of them. CRADA would allow us to provide these parts to somebody and to see if they could develop a repair and that would give us something that we could go out and buy at a much cheaper repair and much cheaper than buying new ones.

>> And the other organizations are participating. Other institutions, for instance, University of Oklahoma and Oklahoma State University are participating as is Tulsa University for our all listeners over in the KRMG area.

>> Right.

>> And of course you can hear, you know, if you're in the OU [inaudible] you hear us on KTOK every Sunday afternoon but, it brings in some of the best minds in the State of Oklahoma to come in to play with this interaction between the Air Logistics Center and whatever else is brought to bear.

>> And that's the beauty and the folks that are leading that effort, [inaudible], talk to them regularly and they're so energized and so excited about it. And the beauty is diversity of the people that can reach out and touch. And some of our promise, you know, we come at, you know, unidirectionally from one functional area, you know, metallurgy or something. But they can look at it from many different perspectives and that's what you get with a university and academic environment. And we're looking forward to the thing, you know, out of the box solutions that we can do together.

>> Very good. You know, in other area that you discussed very briefly, X-Ray Diffraction (XRD) Residual Stress Measurement Equipment, and of course, you talk about the aging of our fleet--

>> Right.

>> And everybody here's about the B52 that was put in service back in the early 50s and it's supposed to have like an 80 or 90-year life span, is that correct?

>> Absolutely. Yes, they'll be flying there. Let's see--I forgot the rubric, but like they're grandchildren of the people who built it will be flying it.

>> Exactly.

>> They go for a long time. This effort here is to give us a better way to measure the residual stresses and materials which is very important. We've done operations to it. We've machined it or heat treated it or plated it or whatever. Sometimes you can induce stresses in there that can actually cause it to fatigue and wear out sooner than you would like. You need a great way to measure that in this capability here as you don't have to damage or even touch material to do it. You can just sense the residual stresses. Very powerful technique and we're looking forward to results there.

>> So great things going on as result of this MOU. Got 1 minute, Dan, I wanna bring you into this because--where it's a point where we can talk about what possible state resources come into

play here. And you've mentioned EDGE in the past and the state SBIR program. Those kinds of programs, how do those interact with this process?

>> Those were all ways to help fund this program. When we totally come up with a solution to a need, there's gonna have to have some money to put that solution into practice and the existing programs, OCAST programs, EDGE, the Small Business Innovation Research Program on the federal side, those are all ways to get these programs funded. And I think about that, to get that money, you still will have to go through the vetting process to make sure that the technology and the proposed solution is vetted throughout these expert reviewers to make sure that we really have the best solution to the need.

>> And very briefly, we're almost at the end of the segment but I just wanna say that Russ and his team manages and tracks an average of 30 SBIR active projects for your Small Business Innovation Research. A lot of people don't think that's very important to Oklahoma. It's extremely important to the state's economy.

>> It is. We're gonna take a little break. We've got lot more to talk about when we return on Oklahoma Innovation.

>> There's more to learn on Oklahoma Innovations with Gary Owen and Steve Paris on the OCAST Radio Network.

[ Music ]

>> Science and technology affects nearly every aspect of our daily lives. Everything we use had to be developed or invented. What would our lives to be like without science, research, and development. We'd most likely still be living in the dark ages. OCAST, the Oklahoma Center for The Advancement of Science and Technology, provides competitive funding for cutting edge Oklahoma research and development. In fact, OCAST is Oklahoma's only agency whose sole focus is technology, its development, transfer, and commercialization. Our goal is to diversify and improve Oklahoma business while helping build a solid technology-based economy. The technology developed by world class Oklahoma researchers is a major component of the message to the rest of the world that Oklahoma is open for business. To learn more about how OCAST investments help our state compete and profit from Oklahoma innovations, visit our website. Just type O-C-A-S-T in the search window of your browser. You'll be linked to a world of fascinating discoveries being developed in your own backyard. OCAST, an investment in Oklahoma's future.

[ Music ]

>> Each week, this program tries to bring you interesting subject matter and guests talking about science, technology, commercialization education and then of course, partnerships as we're talking about here with OCAST in the Oklahoma City Air Logistics Center. And as a matter of fact, the Logistics Center last year produced 129 aircrafts, 260 engines and 69,000 component parts. Wow!

>> They're busy out there.

>> Busy.

>> You bet, and the whole--the things that they do, go around the world in defense of the United States of America and in furthering our national interests. So, it's extremely important. The Oklahoma City Air Logistics Center plays a major role in the nation's defense system. And we

have Russ Howard with us, is--we want just to ask him a little bit about this SBIR program, Small Business Innovation Research. Those of you who listen often hear us talk about that quite a bit because we, our job at OCAST is try to get as many SBIR projects, qualified projects coming to Oklahoma as possible. You got some good example, Russ, of what you're managing at the Air Logistics Center. Talk to us about that.

>> Yeah, our share of it is about 5 million dollars a year and we're processing 15 to 30 at a time at any moment. And the way we--we focus them on the areas that--of a concern to us, where we have some short falls, something we need to do better. And they go through various phases where you start with basically a research paper and then you go to a prototype and then you actually--The intent is to come up with a commercialized new product that can be sold but also benefit the government. And it's a lot of great successes over the years. Glow sticks are by--sort of the glow sticks [simultaneous talking], this came out of a navy SBIR. There's been vaccines that came out of National Institutes of Health SBIRS. And it is federal government [inaudible]. And I believe the state has some SBIR funds as well.

>> Yeah.

>> And a couple of examples of things we had going. There's company in Tulsa called Veracity. They were working with on the ultrasonic, nondestructive inspection. What's neat about what they've done is they've taken medical technology breakthroughs. It's called beam forming. We'll get in that--with how that works, but it allows you to image the inside of a structure and look through layers. And when you have all their planes that are made up of a lot of layered material, it's real nice to see what the 5th layer is doing without taking it all apart. And working in this particular project, they're also working with OU to develop a robot that will walk along the top of the wing and without a person having to be continually moving the sensor--

>> Yeah.

>> --and take the data automatically. So we're excited about possibility of that.

>> Make it faster, better, more effective, and less costly at the same time.

>> Yes sir.

>> RTA Systems Inc. of Norman has developed a simple method for chemical and biological agent decontamination. That's one of your SBIR projects that you will see. Obviously, that deals with a--with the environment.

>> Right.

>> Which is a major concern of all military with the United States Air Force--

>> Absolutely, but we're a huge industrial operation out there and some of the things we use involve hazardous chemicals, so it's very important that we'd be able to detect it in order to control it and make sure it doesn't slip out, but also protect our folks.

>> Right.

>> And to handle it properly. So, we're excited about that technology and opportunities there.

>> And you have a company, well, Anautics of Oklahoma City. It's won several SBIR contracts and--just very briefly, the SBIR, probably every human in the United States, possibly around the

world benefits somehow from things that have been developed through this program. It's a longstanding program.

>> Absolutely. It's where the federal government has stepped up and say we're gonna set aside a certain percentage of our total development budget for those--for smaller business. And it's a great opportunity to solve our problems and build up a new layer. You know, the future giants of industry could grow out of these small businesses and that's why we do it. Anautics is a great example. They do wonderful things for us. They're very flexible. They worked a lot in the information technology areas, data mining. You know we have--we collect all these data, and we've got to do something with it. So, they help us go out and capture it and do reliability studies and it's been a great ongoing relationship with them.

>> Now we wanna talk about STEM. We've been waiting to get to this because it's a very important program and you're involved in it. Russ, we're gonna bring Dan in on this just a little bit too, but give us just kind of an overarching idea of what STEM is. I mean, we've talked about it on the show, but I'm sure everybody has heard it off enough to know exactly what it is. You want Dan to do that?

>> Well I'll be glad to start, but STEM is the center of everything we do and it's not just the 1200 engineers. It's also chemists and mathematicians and information technology folks. It's math, mathematicians that do analysis for us. We literally could not do what we do. We will have a--this is a technical enterprise.

>> Right.

>> And without these people, we will die. We will wither. And we're very concerned about the future of our STEM workforce and we have to develop the pipe--pipeline, we call it and it sounds maybe a little too casual. It's people that have to decide to get into this area of study. So we wanna go K through 12, college and encourage young folks to get in and get involved. It's a great career. It's a great way to make a living, and it's a tremendous way to serve your country and, you know, lead us toward a bright new future.

>> And the first step is mom and dad making sure those young people has the understanding that, hey, you can be an engineer, you can be a mathematician, you can get involved in science.

>> Right.

>> It's something you can do if you apply yourself.

>> Right.

>> Dan, tell us your take on STEM.

>> It's extremely important for the state of Oklahoma and for this nation to have, as Mr. Howard said, this pipeline of the new minds coming on board and what OCAST strives to do along with a lot of other organizations in the state and with their logistic center is to keep those best brightest minds in the state, and programs that can help link these people to programs like the--going on at their logistics center, help keep those minds here, and that's vitally important for us.

>> I think the challenge, and we've talked to other educators is the challenge of stimulating interest in these fields because you are dealing with math when you talk about chemistry and you talk about the things going into the--the education background needed to go into engineering which we understand that's another area of that we need to be growing that pipeline as engineers.

But the young minds, today are so creative. And the ones that you get into these fields, I mean they're just--it's marvelous talent there.

>> Absolutely, I tell people a lot that the people were hiring today, I could not compete with. I mean I would have not gotten a job at Tinker Air Force Base. I wasn't as good a student and as good with problem solving with technologies as the current crop is and we're so blessed to have the university system that we have here in the state.

>> But don't you think that the computerized technology--

>> I do, sped things up a lot.

>> --of today and tomorrow has really kind of sped things up, hasn't it?

>> It's handling information at an accelerated rate and yeah, folks like me who are fumbling around trying to program the VCR

>> You still use the [inaudible] now do you?

>> No, no. I have one but I don't use it.

>> Or just a simple as learning text.

>> Absolutely.

>> Texting, you know, where the--

>> I don't think my thumbs can do that.

>> Well let's talk about engineering. That's your field and I'm hearing that we really have a shortage of trained engineers coming on and that's of course part of the reason for STEM.

>> Well nationwide, that's certainly the case and people, you know, look around the world at developing markets and compare how many engineers that this nation is producing as compared to people like China and India.

>> Right.

>> They're really just--and the difference is of course they can decide early in a child's career. You're gonna be an engineer when you go to school.

>> Yeah.

>> And that with us it's absolutely a free choice and people make other decisions. We need to make that an easier decision for them to make.

>> Exactly.

>> The common engineering and I think they just don't understand what a great opportunity it is or, you know, I don't know what the barrier is, I guess is math. Fear with math is the--

>> You know I think--I think a lot of it is exposure too to these careers early on. Taking kids to fieldtrips to where they see some of the work going on. I mean there's some cool things going on.

>> We do a lot of that, Gary, we need to do more.

>> Yeah.

>> And we have kids coming through all the time. We have educators coming through. We had a big educators' day last year. We need to do more of that. We need to grow. We need to talk more and we have some great proponents of STEM in our local community. We need to partner with them and host events, and we're gonna be doing, it's more of that.

>> Yeah. And you're kinda approaching it from an overarching standpoint is, you know, here is to go, and if we can get educators and parents and children into this, will they understand what the overarching concept is? They will find a way to get--get through these programs and it becomes a very important part of the [inaudible].

>> And the government is getting much more creative on helping kids now. We can actually give internships to high school kids now.

>> That's great.

>> And actually pay them to come in to deal or work with us, then they go back to school.

>> I was gonna say incentives is a big issue there.

>> We're gonna be doing more of that.

>> Very good.

>> That's wonderful.

>> We got about a minute? Yeah.

>> We're down to less than a minute. Okay let's talk about, we always like to get futuristic and that's a problem with--may or may not be your area, I don't know, but you kinda have to do, look down the road a little bit in your position to see where we're gonna be at the Air Logistics Center 5, 10 years down the road. Give us kind of a--[inaudible] giving you away any trade secrets, kinda where we're gonna be?

>> Well, I don't see the future very well but it is my responsibility to look down the road and make sure we're ready for whatever comes. And that's gonna require the solid STEM workforce, good solid processes. We spend a lot of time thinking about how we do things. And you've heard of concepts like Lean and Six Sigma and all these kind of--

>> Right.

>> --process improvement, and Dan's our leader. General Gillette [phonetic] is in--is a passionate proponent of that and we're looking at every thing we do and how we do it. I'm sure we're gonna have a wonderful facility here.

>> Exactly.

>> Five years, 10 years, 20 years, however long the nation needs us.

>> Well, and we hope it's even beyond that.

>> Absolutely.

>> I mean it's--the Air Logistics Center is a tremendous benefit for the state of Oklahoma. Gary?

>> Russ, Dan, thank you so much for being on the program and Dan, thank you for [background music] bringing Russ out here and congratulations to OCAST and Tinker for a great partnership. We'll see you next week on Oklahoma Innovations. Steve.

>> See you, Gary.

[ Music ]

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