

## Blog Series – The Focused Ultrasound Foundation and Koch Disruptive Technology Discuss Advancing Focused Ultrasound

Neal F. Kassell, MD, the Founder and Chairman of the Focused Ultrasound Foundation, recently sat down (albeit virtually) with Chase Koch, the President of Koch Disruptive Technologies, for an in-depth discussion about the field of focused ultrasound and how their organizations are working together to revolutionize therapy with this highly disruptive technology. [Listen to the full conversation >](#)

Below is a three-part blog series edited and condensed from their conversation. Read on to learn more about KDT and Koch Industries, why they are excited about focused ultrasound, and their message to the community at large. The second article in the series will explore the state of the field as it transitions from research to commercialization, and KDT's relationship with the Foundation as they pursue their shared goal of improving the lives of millions around the world with focused ultrasound in the shortest time possible. And in the final installment, Dr. Kassell and Mr. Koch will discuss KDT's current position in the field, future investment plans, and how they feel about spawning the first focused ultrasound "unicorn" (a privately held company with a valuation of more than one billion dollars) via Israeli manufacturer Insightec.



### Blog #1

## Koch Disruptive Technologies: Who They Are and Why They've Invested Hundreds of Millions in Focused Ultrasound

Approximately two years ago, a pivotal milestone in the evolution of focused ultrasound occurred when [Koch Disruptive Technologies](#) (KDT), the venture capital arm of Koch Industries, began investing in the technology. The involvement of KDT was like an IV infusion of high-octane adrenaline, validating the field and creating the precedent for other strategic investors to come in off the sidelines, spurring additional investment. We asked KDT president Chase Koch about the revolution in therapy created by [focused ultrasound](#) – the noninvasive, game-changing, highly disruptive technology that is an alternative or supplement to traditional surgery, radiation, drug therapy, and immunotherapy – and also about how KDT was formed, why they got involved in the space, and what they hope their influence will achieve for focused ultrasound patients worldwide.

**Dr. Kassell: Some of our audience may not be familiar with Koch Industries or KDT. What can you tell us about the two companies and the philosophy of Koch?**

Mr. Koch: Thanks so much, Neal. So [Koch Industries](#) is a private company with 10 different industry business platforms that cut across the majority of the economy, with 130,000 employees and operations in over 60 countries. We endorse a philosophy of three core principles which I'll explain in more detail: 1) being "capability bounded" versus "industry bounded," 2) a belief in creative destruction, and 3) the concept of mutual benefit. KDT was launched from Koch Industries as an extension of these principles.

In terms of the first point, the majority of businesses think from a standpoint of, "How do I get in one industry and grow market share and demonstrate value there?" – which Koch does across all of our different industry platforms – but across Koch more broadly, we approach it first from, "What core capabilities do we have that are demonstrating value to customers and consumers in one industry?" and then we prove that out, which helps us then say, "What are the other industries that we can point those core capabilities at?"

The second principle that's been important for Koch is this idea of creative destruction, meaning you have to constantly destroy your old practices, your old procedures, and even your products that you've been successful with over time – because the market's going to do it to you if you don't do it yourself. So that requires a very open mindset versus a protectionist mindset and trying to guard what you've done historically because we believe that – and it's proven over

time – that doesn't work.

And then the third idea is this concept of mutual benefit: "How do we help our customers win and how do we create value for them?" If we start with that mindset of creating value for our customers and for society, and we do that well, then we will earn margin in our products and be able to reinvest that over time. Starting with the customer requires much longer term thinking than, "How do we make money and capture returns?" And then if you do a good job there, you can earn those returns.

So we created Koch Disruptive Technologies about two years ago as an extension of those three ideas. We all know that technology is changing every single aspect of our lives, and we have to keep up or even be ahead of that pace of change. We feel like it's life or death, for not only the business units that we play in today, but Koch Industries overall. We've recognized with the pace of change in technology that we have to apply creative destruction more aggressively than ever, and we need more technology capabilities to do this.

**Dr. Kassell: Can you tell us more about KDT specifically and how it relates to the highly disruptive technology of focused ultrasound?**

Mr. Koch: We wanted to bring Koch Industries to the most disruptive and transformative founders in the world, and bring that platform as a laboratory for them to experiment in, and to be able to leverage and take our assets, and be able to unlock more value in their company than they otherwise would just taking capital from anyone. So this was the key thesis, this "Koch Laboratory," to bring it to founders in a way that no other large company had done.

Other large companies may have great assets and capabilities, but they struggle to overcome silos in their businesses – sometimes incentives aren't aligned, they can be slow and bureaucratic, and even try to tie the hands of the founder with exclusivities around the technology. So we said, "How can we create a business within Koch that actually does the opposite of all that and really provides a solution that the market hasn't seen before?" Then we started KDT in January of 2018 to originate these disruptive and transformative founders and companies, invest in them, and then connect them into Koch through this Koch Laboratory concept.

I'll just add too that with KDT we want to provide one-stop shopping across the economy with this white glove treatment, and we try to offer our capabilities and subject matter expertise to help companies grow. We can be a customer of these technologies, we can be a supplier in some cases, and also a validator as in the case with focused ultrasound, which we'll talk about more in a minute.

We also try to have a "founder first" mindset, back to that mutual benefit idea I described before. We help companies solve the problems that they're facing, whether it's a capital solution, or understanding the regulatory environment, or helping them with manufacturing or hiring processes.

We also bring highly flexible capital structuring to founders which is another key differentiator; we can enable founders to stay private and grow for decades into the company they want to be, or if they're interested in going public within two or three years, we can offer that flexibility as well. And we bring critical and strategic thinking to the table as well, to really help founders think about the future of their company.

**Dr. Kassell: What captured your interest in focused ultrasound?**

Mr. Koch: I didn't know anything about focused ultrasound until a call came in from a trusted source to Koch Equity Development, and we thought it was a better fit for KDT which had just launched, so the timing was perfect. We started our diligence process and started digging in, and pretty quickly we knew it was something that we wanted to be a part of.

Our team first saw the magic of focused ultrasound in a procedure up at [Sunnybrook](#) in Canada, with a patient who had essential tremor, and we saw the shaking that this patient had going in, and how within a couple hours this person came out after the procedure with almost no shaking and able to write clearly on a piece of paper and drink a cup of water without spilling it. It was like magic, right? And seeing is believing on some of these new technologies.

So when we saw that and met the team, we said, "How can we go from seeing that one patient at Sunnybrook to helping millions experience this groundbreaking technology? How can you take it from one disease, essential tremor, and apply this ultrasound technology to many?" And, of course, it's also safer, more cost-effective with much better outcomes, and much lower risk to the patient versus the alternatives like deep brain stimulation with ET for example. We knew this was something that we wanted to be a part of.

**Dr. Kassell: What would you say most excites you about the technology?**

Mr. Koch: Focused ultrasound is a foundational technology in a platform that has the potential to help millions of lives across so many different brain disorders. The "multiple shots on goal" kind of concept here: It can provide multiple therapy modes, so it has ablation capabilities, has the ability to open up the blood-brain barrier for targeted drug delivery, and the ability to hit so many different disorders – essential tremor, pain, epilepsy, oncology, addiction, Alzheimer's.

There are so many different disease states that can be treated with this, that's one of the main reasons we're so excited, and we're excited about [Insightec](#) and their leadership in this space. If they can do well, then that's going to inspire others to innovate and spawn a lot of different technology to help transform this space and help so many patients.

**Dr. Kassell: What message would you like Koch Disruptive Technologies to communicate to the focused ultrasound community at large?**

Mr. Koch: I appreciate the question, Neal. I think our involvement with focused ultrasound exemplifies our core values of whatever we do, we're trying to transform people's lives – that's a core vision of Koch Industries. How can we make people's lives better and do it in a way that's better than their alternatives and always consume fewer resources? That's one of the reasons we're so excited about focused ultrasound.

The other thing I would say is that we're always looking for opportunities to advance this field. So we encourage the community at large – the focused ultrasound community and the healthcare community broadly – to share their ideas with us in what role we can play to really drive change faster in transforming people's lives. And I can't overemphasize the role that the Focused Ultrasound Foundation plays in driving the field forward. I hope that all stakeholders in this space will continue to enthusiastically support and partner with the Foundation and also the industry across their various programs.

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## Blog #2

### Foundation and KDT on the State of the Field, Their Partnership, and What's Next for Focused Ultrasound

*[Dr. Kassell begins this section by talking about the field of focused ultrasound and the role of the Foundation.]*

[Focused ultrasound](#) is a big deal. It's an early-stage, noninvasive therapeutic technology that is a highly disruptive, game-changing alternative or complement to traditional surgery or radiation, a new way of delivering drugs in extremely high concentrations precisely to the point in the body where they're needed, and a way to stimulate the body's immune response to cancer and thereby augment or enhance the effectiveness of cancer immunotherapy drugs.

The technology will transform the treatment of a [variety of serious medical disorders](#), including Alzheimer's and Parkinson's disease, epilepsy and stroke, OCD and depression, arthritis, benign and malignant tumors of the brain, thyroid, breast, lung, liver, pancreas and prostate, and many other conditions. Thereby, it holds the promise of improving the lives of millions of people around the world.

In 2017, approximately 100,000 patients were treated in 60 treatment sites around the world. The Foundation's goal is that by 2035, more than one million patients will be treated in as many as 10,000 treatment sites around the world. Today, there are more than 130 indications or disorders in various stages of research and development and

commercialization. Approximately 30 of these have regulatory approval around the world, with five from the US FDA including [prostate](#), [essential tremor](#), [Parkinson's tremor](#), pain from [bone metastasis](#), and [uterine fibroids](#).

Being totally noninvasive, focused ultrasound can be performed on an outpatient basis with no incisions, less pain, and decreased complications – including hemorrhage and infection and collateral tissue damage – which translates into more rapid recovery. It really is one of the rare technologies that fulfills the Holy Grail of both improving outcome and decreasing the cost of care.

It will be as revolutionary to therapy as magnetic resonance imaging was to diagnosis, and will spawn a multibillion-dollar industry, but it's in its early stages of evolution; it's where MR was 30 or 35 years ago.

### **State of the Field**

Fields like focused ultrasound evolve exponentially. The growth of focused ultrasound has been much more rapid than anyone anticipated. We're just now at the inflection point of this curve, and the dialogue has shifted from "if" to "when" focused ultrasound will have a real role in the therapeutic armamentarium. And our job is to make "when" now.

Every month that transpires where focused ultrasound is not available translates into unnecessary death and disability and suffering for countless people. Our mantra is: "Saving time, saving lives."

But more importantly, focused ultrasound is just at the point where it's transitioning from primarily a research environment to a commercial and patient treatment environment. The predicate for our vision of one million patients being treated around the world annually is having successful commercial organizations to manufacture and distribute the technology. The research phase has been driven primarily by philanthropic dollars from foundations and individuals and government, but the commercial phase will depend primarily on investment from the private sector – more on that from Chase Koch below.

### **Role of the Foundation**

The evolution of any new highly disruptive therapeutic technology – from idea and concept and laboratory research to widespread utilization as a mainstream standard of care – is a glacial process that often takes decades. And every month – I'm repeating myself but it's important – every month that this technology is not available is translating into unnecessary death and disability and suffering for countless people, including our friends, our family, and ourselves.

In October of 2006, we created the [Focused Ultrasound Foundation](#) as a unique, highly entrepreneurial medical research, education, and advocacy organization. Although we're not venture backed, we absolutely operate as a venture backed, high performance, high impact, high technology service organization in the private sector. All of our systems and our processes and our culture are what you'd see in a similar organization in the private sector.

Our strategy is to examine on a regular basis (quarterly), the critical path from laboratory research to widespread utilization as a standard of care. We identify the choke points or barriers, and then we apply resources where we can be effective in overcoming those barriers and make an impact.

We have a variety of activities that we engage in: We've become the compass or the guiding light for the entire field; we influence the direction of the field by identifying critical unmet clinical needs and setting research priorities; and we work hard to change the culture of the entire ecosystem – all of the stakeholders in the ecosystem – to make them more patient-centric with a high sense of urgency and collaboration by breaking down silos of secrecy.

One of our major activities is to organize, conduct, and fund research to develop the evidence of feasibility, safety, and cost. We educate clinicians and scientists through our fellowship and internship programs, and we orchestrate the flow of information by aggregating and sharing knowledge through our website, our newsletter, our webinars, and social media channels. And we organize and sponsor a number of meetings and symposia and workshops. There is much more information about all of this on the Foundation's website, [fusfoundation.org](#).

*[The dialog resumes at this point.]*

**Dr. Kassell: So Chase, back to you. From your perspective, what most impresses you about the Focused Ultrasound Foundation and the contributions that it makes?**

Mr. Koch: Sure, Neal, I can attest to what you all are doing and validate your strategy. I see it from my seat and I know the Insightec team certainly sees it in their partnership with you – to help drive faster adoption, more awareness of the technology, and research that wouldn't be in the marketplace otherwise, had it not been for what the Foundation is doing.

But to back it up a little bit at a higher level, the way we think about partnerships at Koch, we have a little bit of a mental model on this. Any successful partnership has three requirements: 1) we have to have shared values, 2) we have to have a shared vision of the future and where we could go, and 3) we need to bring complementary capabilities.

If I put Focused Ultrasound Foundation and Koch through that framework and that model, I think from a shared value standpoint, clearly we have them. We both believe in breaking barriers to transform people's lives. We both believe in driving what we call a republic of science – making sure that there's a global network to get at the best knowledge. That's critical for breakthroughs. We can't do all this ourselves; we have to leverage what's in the marketplace.

And we certainly both believe in creative destruction. I think both organizations are very entrepreneurial. Neal, I know your travel schedule and how hard you hit the pavement, and I see that in the rest of your team as well. So from a value standpoint, I think we get a big check there on our partnership.

Then from a shared vision standpoint, we're both trying to transform millions of lives and make a meaningful impact across this industry. And on the complementary capabilities, from the KDT standpoint, we're bringing capital to the game with Insightec as our key bet to advance the space. Hopefully, we're bringing some validation and some more credibility to the field as well with our interest there.

And then lastly, also regarding capabilities, from a regulatory standpoint and understanding how to navigate the space, which is highly complex, we have a lot of experience in navigating the regulatory waters here. And then from the capabilities that you went through, I think it's pretty obvious here: You guys have capabilities to create awareness, research capabilities, education, networking, and collaboration to connect the dots across the industry. You go through that model and I think it's a pretty darn good partnership. And so that's why we're excited about what you all have done and what we can do together going forward.

**Dr. Kassell: Agreed. How has the Foundation helped Koch Disruptive Technologies?**

Mr. Koch: The Foundation has certainly helped us in a lot of ways. I would say the first thing is really supporting clinical trials, for the whole industry which helps create awareness and improve research that otherwise would not be done. And I know there are several partnerships there with Insightec, which obviously helps KDT. You guys have identified subject matter experts and philanthropists to fund essential research to help grow the sector.

You've also helped us think through core questions in our diligence process of looking at the company when we didn't have a lot of background in the beginning. And you helped us expand our network in the field so that we can continue to understand and learn the landscape and figure out what growth opportunities are out there for Koch Industries and for KDT.

And I think broadly – I mentioned this before – but just creating awareness for the space. That helps the whole industry, and certainly helps Insightec and helps KDT. You guys do an excellent job promoting the sector and promoting the industry and bringing awareness to it in this space, as you mentioned before, that's relatively early.

Also, you mentioned, Neal, that it took roughly 30 years to get MRIs to be really that standard in the marketplace; I think we can do it much faster, especially with social media and new communication tools to get this out there, and the amazing network that you guys have. We're going to be able to really blow this out in terms of awareness and do it much faster than what we could do even 10 years ago.

So I'm excited to partner with you, with Insightec, with the rest of the field to do that. The other thing we need to do is continually apply creative destruction to our relationship as well. What I mean by that is, constantly change our methods and practices in creating awareness, in building our network, in everything that we do together to continue challenging and innovating the way that we've done things to tilt this curve even steeper.

**Dr. Kassell: From the Foundation's perspective, we can't imagine having a more suitable partner than Koch Disruptive Technologies in that our values are essentially totally aligned, our visions are aligned, but most importantly, the chemistry on a personal basis works extremely well. So we're very grateful for your support, it's a pleasure and a privilege to work together on this noble cause, which will revolutionize therapy and improve the lives of millions of people around the world. And opportunities to be involved in activities like this only come around about once in a lifetime – the opportunity to employ capital and other resources, whether you're in the public or private sector, only comes around once in a lifetime. And it's a privilege for all of us to be involved in this.**

Mr. Koch: Well Neal, thank you and the Focused Ultrasound Foundation for your partnership. We are certainly extremely excited to work with you and Insightec to make a meaningful impact to transform millions of lives.

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## Blog #3

### KDT Talks Current Position in the Field, Future Plans for Focused Ultrasound

**Dr. Kassell: In a short time, your [investment](#) in Insightec has spawned the first focused ultrasound unicorn. In other words, a privately held company with a valuation of over a billion. How do you feel about that achievement?**

Mr. Koch: Well, first of all, we're just very proud to be selected as a preferred partner by Insightec, that they wanted to partner up with us and really make a go of this, and make a meaningful impact to the world. We feel great about the significant investment that we've made.

I would tell you, Neal, I'm also very proud that it was our first investment. And I think it's great that it's in Israel. I've spent quite a bit of time now over in Israel – it's a wonderful entrepreneurial culture that we feel like is very aligned with Koch. So, getting into Israel with an investment with people and the culture that Insightec has, we feel really great about that.

And looking at the progress we've seen since that first investment, I'll share a few data points on why we're so excited to continue the investment with Insightec, and that is just the number of procedures. Since we made the initial investment in January of 2018, they've doubled the amount of procedures every year. They've treated now close to 3,000 essential tremor and Parkinson's tremor-dominant patients in just those two years. They've expanded their talent and capabilities immensely. There's exploding interest for their technology from hospitals, from universities, and they're now commercial in 22 countries with an R&D pipeline that has tremendous potential, as you know.

**Dr. Kassell: Can you be very specific and tell us how Insightec fits in the vision of Koch Disruptive Technologies?**

Mr. Koch: I'd love to Neal, and I appreciate the question. There are a lot of folks in the marketplace that ask us, "This does not seem like a Koch Industries kind of obvious choice in terms of investment. How did that fit your vision?" And we tell people it is actually right in the heart of our sweet spot of the type of company we're looking for.

Let me take a minute to articulate why Insightec is such a good fit. We screen companies and opportunities across four things: 1) principled entrepreneurship, 2) disruptiveness in the marketplace, 3) how high of potential does it have? and 4) is there mutual benefit between Koch and that company? So let me just articulate "why Insightec?" across that filter.

On principled entrepreneurship, this is the very first filter we look at. We believe it's very important that there's true leadership at the top – great principled entrepreneurs that have a track record of growing companies and they're going to do it in the right way, with a management team to support that leader. We think that's critical in launching and growing any technology business. I would say Insightec specifically has shown extreme foresight in how they hire, how they promote, and how they grow their leaders to make sure that they've got the best team in the market and we're all

in on this process with them.

We go back to the founder Kobi Vortman and his vision for creating this technology in the first place back in the late '90s. And then Maurice Ferré who is currently the CEO of the company. He's had a great track record, he's a cofounder of Mako Surgical, and oversaw very successful growth of that company. So we had seen that he had done it before. And what he's done to build a truly awesome leadership team. We have such a good feeling about the culture of what he's building and the team that he's got to support him, and how entrepreneurial this team is. We feel really good about the future. And so that's the first one, principled entrepreneurship. They really demonstrated that; we saw that right out of the gates.

The second one is disruptiveness, and we want to see that a technology or a business model is highly disruptive versus the current alternatives in the market. I think the technology speaks for itself. It's driving better outcomes at a lower cost, enabling doctors to conduct incisionless surgery, which is amazing, right? Getting a doctor, helping them go from a scalpel to sound waves, to be able to do this in a way that's noninvasive, and from a quality of life standpoint, highly disruptive to the existing alternatives in transforming people's lives. We're very, very excited about both the value to the patient, and also the cost to the patient as well – it's disruptive on both ends of that.

The third one, high potential. We always ask the question, "Can it be a platform?" This is a guiding principle that we look for in value creation regardless of the sector. It's the diversity and capability that a true platform technology can deliver, and in Insightec we see and have now validated the true benefit that a closed loop technology platform can offer both to patients and physicians. They've got extremely efficient learning curves, and the diversity of the shots on goal they have with the various indications, and then the growth of adoption across the world for both commercial and research applications, all really support this thesis that Insightec is already a platform.

And then the fourth piece is around mutual benefit. Can Koch help a company like Insightec beyond just writing a check? The capital is important but what's more important is to be able to help them with their strategy, help them with manufacturing. Our Molex company in the electronic space helps them think about how they manage their supply chain, and how they design their manufacturing capabilities.

And from a regulatory standpoint as well, our public sector team helps them get in front of the right decision makers and the FDA to demonstrate their technology and how it can transform millions of lives and create that awareness within the right regulatory bodies. I think it's been important to Insightec's growth and success.

So we saw that mutual benefit opportunity where we can help them beyond the capital. That was kind of the last test and we said, "All four of these line up, this is in the sweet spot of the type of company that we're looking for, and that's why we're excited about continuing to grow with them."

**Dr. Kassell: What plans do you have for future investment in the focused ultrasound field in addition to Insightec, if any?**

Mr. Koch: We're always evaluating opportunities that can transform people's lives. So we're very open-minded to continue investing in the space. But I think the latest Insightec investment, the Series F that we just led, shows our passion and support for focused ultrasound broadly and that has significantly increased our position in Insightec and our commitment to the space.

**Dr. Kassell: Is Koch Disruptive Technologies interested in investing in other health sciences, businesses, biotech, med tech, medical research, and so on?**

Mr. Koch: The short answer is, yes. We're constantly looking for highly disruptive innovations and principled entrepreneurs that run these companies in all industries. But we are interested in healthcare specifically. And I think this space is very interesting for KDT.

I mean one is what we're living right now, right? This recent pandemic that's exposing weaknesses to our healthcare system and shows how much opportunity there is to improve it. And we want to be a part of that solution, and also the fact that it's roughly 20 percent of our GDP in this country alone, and it's just a critical industry to help remove barriers

and improve millions of lives.

I'll just tell you what our current exposure to the industry is across Koch Industries – and some of these are from KDT – of course, Insightec is one of the largest commitments that we've made both in capital and capability that we're bringing to the table. In 2018 we made an investment, and then we just made another significant investment in March.

We made an investment in November of last year in a company called Vayyar as well. This was started by a founder named Raviv Melamed using radio frequency technology that started in early detection of breast cancer. Now they're applying this technology across multiple industries. So I encourage you to check that out online – Vayyar is the name of the company. We're very excited about the potential. And then we have a few early stage companies in the pipeline right now.

But clearly, we want more that can be game changers like Insightec – like Vayyar. We're looking across the space and across this theme in the medical space. But we also recognize, Neal, that this area takes patience and it takes significant capital. But we feel like that's a comparative advantage that KDT has, because we have both of those. We're here to help unlock that value across this industry, and we're very excited about the future.