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IMS Expert Insights Podcast: Episode 1- An Aerospace Engineering Expert Witness's Best Practices

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In this IMS Insights Podcast episode, we sit down with Dr. Magdy Attia, a professor of Aerospace Engineering at Embry Riddle Aeronautical University, and a long-time subject matter expert with trial experience. Our discussion centers around the aerospace engineering industry, as well as best practices of an expert witness in complex, commercial litigation.

Episode 1- An Aerospace Engineering Expert Witness's Best Practices

Teresa Barber: Okay, great. Great. What I would like to ask you first is if you could, if you could tell, just kind of briefly talk to me about what your area of expertise is.

Dr. Magdy Attia: My area of expertise is gas turbine engines. This is a group of engines that include jet engines, turbo fan engines, gas turbine engines for power plants, engines for propeller airplanes, turbo shafts, turbo props. So, that category of engines, basically, revolving around something that we call the Brayton cycle in thermodynamics. That's my area.

Teresa Barber: So, what is the Brayton cycle?

Dr. Magdy Attia: The Brayton cycle is a thermodynamic process that describes how air is drawn into an engine, how it is compressed and then heated and then expanded in the turbine section to ... and then you have excess energy, and you can do whatever the designer wishes to do. You can spin a generator and generate electricity, you can spin a fan and generate thrust, you can spin a propeller for propeller-driven aircraft, you can spin a shaft, et cetera. So, it's a very versatile technology. It's used in ships, marine application, it's used in power plants, it's used in, of course, all types of aircraft.

Teresa Barber: So, how did you know that this career was out there, that this area of study was out there? How did you even navigate into this? Did you have a moment as a kid where you were building a propeller and light bulbs started to go off?

Dr. Magdy Attia: That's a great question. The short answer is: I didn't. I didn't know that it existed, but coming to school I always wanted to be a doctor, and my uncle, my late uncle John, he talked to me and said, "Listen: why don't you try aerospace engineering? It's really the future. We have enough doctors in the family. Try that. I think you will like it. You're good at math, you have an engineer's mind." So, I did. I trusted him. He was a professor of chemistry at the university where I went to school, and I followed his advice. For the first couple of years I was trying to find where to land, and then I took a class that is an introductory class to the jet engine, it was jet propulsion, and it just ... a switch was flipped and I fell in love with the science and I decided to continue on to grad school in that particular area. So, I got my master's and Ph.D. in gas turbine engines and propulsion.

Teresa Barber: That's great. That's really interesting. Would you say your uncle was a bit of a mentor? Did you have any other mentors who kind of helped you navigate earlier in your career?

Dr. Magdy Attia: He gave me some really good advice and I'm going to be forever thankful to him. I did have a



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couple of mentors during my career. The first one was the former dean of our college. He really taught me to listen. He taught me to listen. He said, "As an expert, or as someone who is skilled in his field, the tendency is to start talking, but whenever you feel the urge to talk, just listen first and make sure that you understood everything and everyone." I really appreciate him for teaching me that.

Dr. Magdy Attia: The second one, he was really my mentor from a distance, and from him I learned to just never burn a bridge no matter what. If you really have absolutely nothing good to say then don't say anything and just never, ever burn a bridge because you never know when you're going to need to come back that way.

Teresa Barber: Good advice. Good advice. Probably especially interesting too, you know, now, working as an expert witness, I'm sure.

Teresa Barber: So, one, you know, STEM: science, technology, engineering and math. That has really emerged. I mean, we've seen fits and starts of education policy reform over decades, but especially in the last five years or so we've seen a reemergence of especially those core areas as a national imperative. Calls from groups like the US Chamber of Commerce, National Association of Workforce Boards. We even see Girl Scouts of America embracing robotics and engineering with badges for kids. And then a lot of corporate corporations are embracing it as well as part of their corporate philanthropic efforts. Companies like Boeing and Accenture, IBM. We know that it's a bit of an imperative. So, for kids, you know, for kids out there who may not have had the uncle John who had that moment, that conversation with you, and said, "Hey, maybe look over here. Look this way." You know, who may not have the mentors or the family members who were engineers, and they may not know those careers exist, but maybe they do, what would you, what would you say to a 10 year old, 12 year old who might have a lot of aptitude in math, a lot of interest and natural abilities for engineering? What would you tell them to do or look for?

Dr. Magdy Attia: Well, that's a great question. In short, STEM is the future. STEM is the future. We as a nation will only survive and remain competitive if we excel in the STEM areas; science, technology, engineering and math. As you know, Teresa, I'm also a professor at Embry-Riddle University, and I was really flabbergasted. We just finished the semester about three weeks ago, and I was really flabbergasted with one of the students in my class, a graduating senior. He came to me after the semester was over to shake my hand, and he said, "You know, I'm here because of you." I started getting defensive. I said, "Ah, it's just my job." He said, "No, no, no. You don't understand. You came to my class when I was in fourth grade and-

Teresa Barber: Oh, wow.

Dr. Magdy Attia: "And you brought engine parts with you, and I became just enamored with the technology, and I decided to come to this university and become an engine, specialize in engines." He was actually in the same fourth grade class with my oldest son, so it was really ... And I had, you know, of course I couldn't remember him from that long ago, but it was a really inspiring, inspiring moment.

Dr. Magdy Attia: But going back to the importance of STEM, it's really the future, and as we move forward, especially the area of aerospace. It is the one area where I say we are still the leader in the world by a mile. When I look at the graduate schools in aerospace engineering I find students from all over the world still coming to the United States to study STEM, and particularly aerospace engineering, here in the United States. And so, for anyone interested or even thinking. If you think you are good in math, if you like solving problems, if you have three-dimensional tendencies, you really should consider engineering. It's a great profession, it's a great job, it's very stable, you will always have a job, you will always enjoy your job, you will always be working on very, very interesting, cutting edge technologies, cutting edge vehicles, airplanes, engines, rockets, satellites. It's just super cool.

Teresa Barber: So, what are the careers of the future for aerospace engineering? Where is the industry heading in five years? What kind of problems will aerospace engineers be solving?

Dr. Magdy Attia: Well, we are really working hard to get a strong grip on the proliferation of computers in aerospace vehicles. The airplane is really no longer an airplane; it's a flying computer. Engine is not really an engine; it's a computer that produces thrust. There are computers in everything doing almost all of the function and controlling the flight vehicle, controlling the engine, controlling everything inside. I don't know if I said the word computer enough. It's really the future. As you are aware, the Boeing 737 MAX accidents, tragic as they were, it was a computer. It was a computer that did it. Whether it was programmed correctly or incorrectly or what happened, but it started and ended with a computer.

Teresa Barber: So, I would assume then you really don't get to stop learning. You have to stay curious and you have to keep evolving and learning with your field, especially-

Dr. Magdy Attia: That's true for all engineers, but it's particularly true if you want to be an expert and if you

want to be an expert witness. You cannot stop learning because you are on the cutting edge versus other experts, always looking at the latest technologies and how they might be applied. You're always coming face to face with the smartest people in our industry in terms whether it's opposing expert witnesses, or you are reading patents, or you are reading publications. You really have to be on your game, and in order for you to be successful you have to continue to learn, but you really have to love learning. If you just do it just to do the work, it's probably going to get old after a while. You really have to love learning, and if that's you, you're probably going to be a very successful expert.

Teresa Barber: What do you in particular, Dr. Attia, what do you most enjoy about working as an expert witness?

Dr. Magdy Attia: Well, I love, I love learning, and in my work as a professor, there is the tendency to always give knowledge, and to always present, and to always be in front of a class talking, so the time that you get for yourself to read and to learn may not always be there. So, being an expert witness affords me the opportunity to learn. I have to read, and I have to familiarize myself, and it's great because every time I think I know something, I read a patent or I read a slightly different way of applying the sciences, and I'm always learning. And I'm really always ... I always find myself very impressed by engineers of 40 or 50 years ago, what they were able to come up with without a computer. Think about it. The first Boeing 727 and the first engines that powered it were really designed without the benefit of having the computers. I have nothing but respect for those engineers, and I'm always looking to learn from them and just to think how they did it and what were they thinking, what knowledge they must have had to be able to come up with this without a computer, and I'm very impressed, and I continue to challenge myself to be a worthy expert.

Teresa Barber: Yeah. How did you first get engaged as an expert witness? And it's a little bit different, right? So, you know, as a professor, as a subject matter expert, functioning as an expert witness is a little bit different. How did you first know that that was even a thing, and how did you first get engaged, get involved?

Dr. Magdy Attia: Again, I didn't. I just got this phone call out of the blue. An attorney had found me on the list of faculty at the university, and they had an aircraft crash, and they needed an engine expert to be a witness for the defense, and he just picked up the phone and gave me a call and we started talking, and I find myself becoming very, very interested in what he had to say. It's almost like a homework problem that I haven't seen before and I wanted to solve it, and it's been like that ever since.

Dr. Magdy Attia: The next engagement with IMS that's been going on for several years now is IMS found me on LinkedIn. So, that's something that I should say to anyone out there who wishes to be an expert, is make sure your LinkedIn profile is solid because you never know who might be surfing and looking for an expert, and if you have the right stuff you might get that phone call.

Teresa Barber: That's great. And with the litigators, so the litigators you've worked with through IMS and independently, what's made those projects successful for you? What's made for really good, you know, kind of effective engagements on those projects?

Dr. Magdy Attia: Well, first I just want to say that I have a lot of respect for patent attorneys. I've done most of my work with patent attorneys, and I have nothing but respect for them because every month they just have to be an expert at something completely different than the month before. So, they're really some of the smartest people that I've ever worked with.

Teresa Barber: Yep. Yep.

Dr. Magdy Attia: But what's really been a key success factor for me is what I learned from my mentors in that experts tend to want to talk. I mean, that's the expectation. You know your materials and the expectation is you're going to talk and disseminate knowledge, and as an expert witness you really should try not to do that. You really have to be a good listener, and to understand the problem, and to understand that you are part of a team, and you are there to do a specific function, especially during a deposition. There is the tendency as an expert to just start talking and not stop. That can be a mistake.

Dr. Magdy Attia: The other thing that makes for a good engagement with attorneys is you cannot over-prepare, especially litigation cases, especially patent cases. There is a ton of material, prior art, and you really need to do your homework, and you really need to do it thoroughly, and you need to read every word and pay attention to every word. I really learned from my work on patents the importance of the word. Yeah. I thought that I knew propulsion, but the importance of every word and how it can alter the sentence, and how it can alter the case, or make or break a certain question, or lead to a successful deposition versus a disaster is if the expert thinks, "Well, I know my business. I really don't need to read all this prior art." That's a mistake. You need to prepare. You cannot over-prepare.

Dr. Magdy Attia: And, of course, number three is always be on time, and always be on time, and always be prompt with your replies. Sometimes there's long periods where you are waiting for the other side to take action, but when they do you have to be ready to respond very quickly because the courts do not give you infinite amounts of time. There's a limited amount of time, and you need to respond to the attorney's questions very quickly so they can understand it, refine their understanding by asking you questions, and then get back to the other side. So, you can't be slack, you can't take your time; you've got to be very quick and very prompt, you have to prepare, and you have to listen.

Teresa Barber: Good. We at IMS, we do work with ... you know, we work with top subject matter experts who have been engaged previously on complex commercial litigation on multiple matters. We have experts we've worked with for many years. Some have been engaged on and retained on numerous matters, sometimes with the same attorneys. Some are really experienced. But we also do, you know, we do work with and connect attorneys to subject matter experts who were like you; sitting in your office, no idea that at some point you might be engaged as an expert witness. And we know that some of those brand new experts or SMEs or first-timers are some of our listeners, so what advice would you give to an SME who is considering ... And maybe expert witness work is not for everyone, right? So, what advice would you give to someone who is considering working as an expert witness for the first time or has just been engaged on their very first matter?

Dr. Magdy Attia: I would say number one: be very attentive to what is being said and what is the nature of the problem. Very often in litigation cases you are just a small part of a team. Don't try to take over, don't try to put everything on your shoulder, don't try to win the case by yourself. The attorney is the boss. You are there to help him understand something very specific. If you focus on that at the beginning, that will boost the attorney's confidence in you, and through multiple engagements you will get better with time in understanding what it is that they need and how you can help. But really, I cannot stress enough: just don't try to put the whole case on your shoulders, and don't try to just go in a deposition and thinking that you're going to win this case for them. That could be a huge mistake.

Teresa Barber: That's good. Thank you. I know we have a lot of new first-timers who would enjoy hearing that.

Teresa Barber: I wanted to ask you for just general feedback on IMS too. I know you've worked with us for a few years now. What would you say ... you know, what's been, I mean, I don't know if you've worked with other search firms or you've worked independently, but how has the experience been working with IMS, working with our team?

Dr. Magdy Attia: I've worked independently, but IMS has been great. What really struck me is the expectation that the client had when I showed up. Their expectation was that IMS always was able to bring them the best. So, it was, you know, set the bar kind of high. But I was really proud to have been the IMS envoy, and I think the relationship has really blossomed. I was initially engaged just to work on one patent, and I'm now going on number 12. It's been almost four years, and there's talk of quite a few more to come, so I don't see an end to this engagement in the near future.

Teresa Barber: Oh, that's great. Yep, yep. Good. Good. Well, I think ... I think those are most of the questions I have for you. Is there anything that you want to touch on that we didn't, maybe we didn't bring up?

Dr. Magdy Attia: Well, with respect to IMS, I felt that they've really simplified the process. It's not easy for an expert to just go out there and advertise themselves and find such engagement. It's really not as easy as one might think. So, signing up with IMS has been a very smart move on my part, and really, IMS's ability to handle all the supporting functions and just let you do the sciences and not have to worry about invoicing and "Did I get paid last month or didn't I," and "How should I go about politely asking these kind of," you don't have to worry about that. Just let IMS handle it. They're good at it, they know what to do, they know how to do it, and you just focus on the technical side. So, that's been a really, really big positive in the relation.

Dr. Magdy Attia: Other than that, I just want to say to anyone out there who's interested in being an expert witness or just a consultant: It's great work. It's great work. It's very invigorating. Every case is different. You're not just turning the crank. You don't get paid to do slam dunks; you really have to do your, you really have to do your homework, you really have to prepare. You're coming up against the best, so you need to be the best. It's a bit of a, a little bit of a rollercoaster, but if you enjoy that kind of life, there's no place better than to start with IMS.

Teresa Barber: That's great. Thank you, Magdy. You brought something up I wanted to ask you about because I know you've testified, you talked about preparing for a deposition before. How important is it as an expert to speak? Because often you're communicating really complex topics and concepts sometimes, right, and it can get a little convoluted at, you know, the wording can even be complex sometimes. How important is it to be clear, to use simple language, or to communicate in a manner that can be understood by, let's say, a jury?

Dr. Magdy Attia: I couldn't stress that enough. You could very easily lose your audience if you're not careful. It's all about the planning and the preparation. You have to prepare. Most attorneys will offer to sit you down and to prepare you by having some practice questions so you can practice your answers. By all means, take advantage of that. You cannot prepare enough.

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