

EPISODE 10

[INTRODUCTION]

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ANNOUNCER: If you're struggling with your vitality, energy, mood, focus, or sleep, this podcast is for you. Your host, Dr. Ann Tsung, ER doctor and aerospace flight surgeon, will help you reach for the stars and remove the barriers or blockades that have been holding you back from living your best life. If you've been challenged by your health, relationships, or productivity, then it's time for a breakthrough. So, here's your host, Dr. Ann Tsung.

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Ann Tsung: Hello, and welcome to It's Not Rocket Science Show. This is session 10. And I am your host, Dr. Ann Tsung. Today is a third part of our three-part series on aerospace medicine and what it's like to be a flight surgeon. If you haven't checked out the other parts, please go to Session Eight, where I talked about my journey from the moment I made that decision until the beginning of my aerospace medicine residency. And then in Session Nine is where I talked about what it's like to go through two years of aerospace medicine training after my Emergency Medicine residency and Critical Care fellowship.

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And today, let's dive into Part Three. So, what do you actually do as a NASA flight surgeon? And that is the most common questions that people ask me like. "So, what do you actually do?" So, I hope that this episode answers some of your curiosities, going back to you know, it was a second year in aerospace medicine training. I remember I applied in the spring semester before graduation, and went through the interview, it's a panel interview at the time it was virtual due to COVID. And I remember the time when I got the call. I was at the airport, after the interview, I was at the airport coming back from the aerospace medicine course with the Air Force from Wright Patterson. So, flying from Dayton, back to Houston, waiting at the gate. And the call came. And Dr. Powers, the Medical Program Director at the time, told me it was like, and I want to congratulate you, and you got the position. And it was just surreal. Because I set the goal when I was 19. I set the goal back then, to become a NASA flight surgeon. That

was 14 years ago, before I got the call. And it was such a surreal feeling to be able to achieve something that you've been striving for, for 14 years. And you finally get the call. And I felt a sense of disbelief. I felt a sense of relief as well, like the weight just came off my shoulders like I've been like going through that, that that process like having this drive behind me to, this motivation, to have to get to this point, and finally it happened and it was just an incredible feeling. I felt at peace. So, I think the first takeaway from this is that if you do the next step, the next micro step, no matter how unbelievable that goal might have seem to you at that time, you'll get there. Everything you need is within you now. So, it was fantastic. I was able to you know, have my virtual graduation. And end of June and July 1st, I was started as a NASA flight surgeon, I was like whoa, it's amazing. And it's awesome to go through, it was awesome to go through the UTMB residency because I've done rotations to flight medicine clinic occupational clinic, I've gone through their meetings, it's I got to know a lot of the flight surgeons already. So, it was a very, very seamless transition. And I got to know the prior residents who were NASA flight surgeons already at the time or work for NASA already and other research or like other projects already. So, it was like I'm just continuing on to what I was doing in residency essentially.

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So, now I want to dive in to some of the basics. You can become a NASA flight surgeon, either as a contractor, so you actually are employed with UTMB University of Texas Medical Branch, which is my position. You're a contractor for UTMB who participate at Johnson Space Center. And you can also become a civil servant and your direct employer would be NASA. The pay with the UTMB contractor position is 150,000 a year to start. And once you pass the preventive medicine occupational medicine board exam that you take in October to November of each year once you pass that, then you get 160,000 per year. The schedule typically work at NASA is Monday through Friday, eight to five, now ours are you know somewhat flexible some people I think work from seven to four some people may work a little bit later.

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And that's what I love about working at Johnson Space Center. They're very, very good at watching out for your personal needs and your family life or like if I need to go to the doctor for anything they're flexible and you taking leave for just half a day. And that's the schedule, typically, if you're not traveling. Sometimes you do have to travel to support crew training or missions like going to SpaceX, or going to Wright Patterson for centrifuge training, or even going to Cape Canaveral Kennedy Space Center. So, then the hours will be different if you're traveling for training, or for other missions and projects.

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Now, what can happen is there's so many positions and different tasks and projects that you can get assigned to. And so, my position is for medical operations. So, what that means is the medical operations flight surgeon. You are going to be console certified to work missions, to staff the Mission Control at Johnson Space Center as the flight surgeon. And you can get assigned crew like usually get assigned one astronaut, you follow them through training, through their mission on Space Station, through the after, when they return, when they go through rehab, you are their doc. Usually, it's you and the primary and then there's a deputy flight surgeon as well with you to help you with all the projects and meetings and coronations that you have to go through. So that's my primary position.

Now, a lot of times you can also work with what's called exploration medical capabilities. So that's XMC. My co-resident, actually, was able to be employed with that specific department. And essentially, what they look at is 20, 30, 50 years down the line of the medical capabilities that are needed for exploration missions. There's a lot of research, there are. So, the other parts that you can get assigned is what's called HLS. So, I'm actually 75% medical operations, and 25% HLS. And that was assigned to me six months after I started the position. And what that means is human landing system. So, it's the landing system that will take us to the moon. And currently, there are commercial companies that are competing to be the provider for the human landing system, essentially, to compete for that contract. So, it's pretty awesome that you, you know, you get to participate in the future missions as well. And you get to have a say in the requirements to optimize human health that has to do with human health on these new vehicle designs to go to the moon. And a part of my medical operations job, I was assigned, out of that 75%, I was assigned to 10% SANS, the Space Associated Neuro-Ocular Syndrome.

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I talked before about how long duration astronauts, they have found that their vision changes that their eyeball or their globe would flatten and also that there will be increased intraocular pressure increased intracranial pressure. And we're still trying to figure out the exact cause we have some theories, but we still trying to figure out the cause. And there's a whole group, that SANS team, that comprises of biomedical engineers, ophthalmologists, physicians, and a ton of other people to work to make sure that we're monitoring the crew to find that. There's also like a Baylor, neuro neurologist, neuropsychologist, there's just a ton of people who are taking part in this, we're trying to figure out the source and the mitigation strategies for those because we're going to moon or Mars for a long duration, we need to know how this is going to impact our mission, and how to have the countermeasures for the

effects. And so, I'm assigned to 10% of that. And so, it's pretty awesome. There are other people who are assigned to neutral buoyancy lab. There's other people who are assigned to contingency, other people get assigned to SpaceX, to Boeing, and commercial space. And also, people who are working in the flight medicine clinic and occupational clinic, the opportunities are literally it's endless, just depends on your interest, really.

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So, when I first started in July, typically you would go through console training to become a flight surgeon, it would take about nine months to a year. And first, there is a lot of computer-based training. You learn about NASA history. We learn about the International Space Station, the systems all the modules, what goes into it, what's there, how they name things, and then you learn about the flight controllers like different positions at mission control and what they do. Like people who take care of power who take care of the International Space Station altitude who take care of the radiation who take care of EVA the extra vehicular activities. And then the flight directors like what do they do or how to interact with flight directors, the biomedical engineers, which you know, as flight surgeons, you work very closely with them, you learn about the astronaut countermeasures you know, when they have bone loss and muscle loss, so, the countermeasures we have for that. You learn about the medical kits that's available, the medical capabilities, the pharmacy equipment, and how you know, the procedures and policies and flight roles. You know, if this happens, then you do this, if this happens, then you do that. Like, what is the cut-off for the CO, the carbon monoxide if there's a fire event? What is the cut off for HCN? And also, HCl, if there's a fire combustion event? And what are the safe radiation limits? What are the countermeasures for that? Tons of flight roles that you get to learn. And then you learn about the ecosystem, the environmental control and life support system, and about water quality, the radiation, you learn about contingency on emergency responses, like if there's fire, there's depress event, and also ammonia exposure or other toxic component exposure.

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So, really learning the policies and procedures and what the astronauts would do and the knowledge that you need to have in order to take care of these astronauts if these events happen. And then going on to medical operations, launch and landing some of the weightlifting, the ARED, what they call Assistive Resistive Exercise Device that they have on the station. You learn about nutrition. You learn about sleep and fatigue counter measurements for the astronauts. You learn about the neuropsychological testing that they go through, the eye testing that they go through, and space physiology was the most important thing how the space motion sickness, you know, when does it

happen, and the most common thing that happens, the moonwalks, what they call, the formal term in NASA, it's extra vehicular activity, EVA. And some of the risks that go into it. The pre-reading that they have to do, the protocols, the risk for decompression sickness, either in training in the Neutral Buoyancy Lab and also during EVA. And you learn about launch and landing support. Currently, they launch from Kazakhstan, and they do some training in Russia. So, some of the risks and benefits the medical packs that go into it in some of the meetings that you have to support during your launch and landing.

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In the very end, it all comes together in multiple simulations that you have to go through, there are eight Sims and then there's a final practicum that you go through. And then finally, after you have passed all that, then you're officially console certified as a NASA flight surgeon, and you can support the missions at Mission Control. I'm currently in the middle of it right now I've finished some computer-based training, some virtual training, and some in-person training. And I would say I have learned a great deal. It's a lot to learn as a physician because I mean, my background, I'm not from an engineering background. So, it's for me to learn what their job is like, what they go through, and how to communicate with engineers, which is just fantastic.

And the other part of my job as a UTMB contractor is that we're signed to Russia to support Star City crew training in Star City, and also launch and landing support as well. So, Star City is a town that is outside about an hour's drive from Moscow. And that's where GCTC is Gregorian Cosmonaut Training Center. That's where the cosmonauts and Russian cosmonauts train. And because we're launching currently on the Soyuz Russian capsule, our US crew gets trained in their system too and the Russian segment of the International Space Station system as well. They have to go through emergency training and Soyuz simulation training. And you are the doctor for the two or three months that you're there, you know, who takes care of crew as they go through training that may be hazardous to them. And you are also the doctor for the NASA personnel who is there.

There is NASA personnel who is typically an astronaut who's director of operations there in Russia. And then there is also deputy director of operations in Russia as well. So those are the NASA personnel and there is Russian personnel employed by NASA who is the support staff at Star City, you will work very closely with them. They interact with GCTC training center so that they can streamline the process with the US crew and help them through their training. So, you work very closely with them, you get to find out what their training is like, you get to learn the Russian medical equipment, the Russian

countermeasures equipment like their, their cycle, their treadmill, the way that they measure (inaudible), they measure the urine, the blood work. So, it's fantastic. It was a fantastic time when I was there, because I really got to know what it's like, when the astronauts go through the training, and how much it could hurt when you're bent in that, you know, scrunch up position in the Soyuz for, you know, four to six hours, it's pretty bad position to stay in. And you can't really move, as a lot of times, they have musculoskeletal pain. And you wouldn't really know until you're actually there when you're monitoring the crew, though. So, it was fantastic training.

And then there's also another position where you could be the doctor in the Mission Control Center in Moscow. And there's personnel who go there to work from NASA. And the Moscow doc is also in charge of the evacuation, if it's needed, you're in charge of a lot of the public health monitoring, working with the embassy if you ever work there. So, when you're in Star City, going back to Star City, there's launch and landing packs, because the primary cruiser agenda deputy cruiser there will come a few weeks before launch and landing of the crew. And you're responsible for stocking the packs. And also for making sure that the pharmacy and equipment are well stocked for your use in Star City for the crew and the NASA personnel to go through the expiration dates and pack the medications to go through the equipment to make sure that they're charged, just to make sure that they have everything they need for launch and landing. So that was a big part of my job. When I was there.

I was able to go there in August, I started in July, I was able to go there in August. And although that's not usually the case, typically you will be going through your training as a flight surgeon, then you go to Russia, but because of the scheduling, that's what happened, which I am super grateful for because I got to know launch and landing process. And now as I'm going through the training, I can kind of use my real-time experience to help me visualize it. So, it was fantastic. And I was there for three and a half months and came back. And now to explain a little bit about my day-to-day or what it looks like the week as a NASA flight surgeon. A lot of times because of my SANS project, my human landing system HLS involvement, I have (inaudible) has to do with those projects. So, for SANS we talk about the imaging tests that we do with astronauts, that's what I'm learning about the imaging and, and the protocols and procedures. We're coming up with clinical practice guidelines or revising the clinical practice guidelines. If the crew participates in a study, it was found to have increased ocular pressure, and increased intracranial pressure, what do we do about that? We're working to find other equipment, noninvasive equipment that can measure increased intracranial pressure. So, we have some meetings with other physicians to discuss that point.

For the HLS system, there's meetings with the three commercial companies to look at a lot of times we're looking at crew controls, their environmental system, the life support system, looking at their emergency procedures, looking at the requirements, say the atmosphere, the O2 requirements, the pressure requirements, even looking at elevators, the risk of elevators and steps. There's just a lot that goes into it when you're trying to coordinate a new vehicle. And you know, making sure we know what is safe for our crew. There was one meeting I recently participated in last week. It's about geology tools on the moon, what type of tools are needed? And as from a flexure, do I need to look at the 10 tools that they presented? And what kind of risks can they pose to the crew? And what can we use as medical equipment? What can we use to improvise? And when they use the tool? What are the injury risk depending on how they're used? So, it was very interesting. So, there are a few meetings like that throughout the week. There's meetings on training the crew, like crew training on various systems, they call human in the loop testing. So, there are some traveling that could be involved. And then the rest of the time, I deal with medical packs for launch and landing at the US side so we have commercial crew launch and landing packs. We have doctors who, what they call direct return doctors, the doctors who go on the G5 to Kazakhstan, or to Kennedy. And then that is the plane that takes the astronauts back to Johnson Space Center back to Houston. So, there's packs that go along with that and maintaining the equipment, placing orders, there's essential inventory, logistics, making sure everything is charged. So as a part of my job in medical operations, that huge, huge focus now is essentially getting through all of the training that I have listed. And hopefully, at the end of the next few months, I'll be able to finish that training, go through the simulations, and become console certified.

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Right now, I am assigned to be the backup, backup like the shadow flight surgeon right now, to the current mission, that's set to launch in April with Mark Vande Hei. And I'm going to use the next few months and use his mission as my training because I'll be sitting on console to kind of learn what it's like, so that I can participate in the simulation, pass the simulation. And if this mission goes on for more than six months, typically they're six months, but there's a chance it could go on to a year, then starting September and on, I could actually help out the team and set on console and go on to the meetings. And essentially, I was able to go through Mark's training when I was in Star City. And it will be just a fantastic opportunity to be able to work a mission with him while he's on the International Space Station. So hopefully, that's what happens the next few months. And I hope I've given you a general sense of what it's like to be a flight surgeon. And you know, depending on interests, it can be so varied. And the projects that you do and what you're assigned to, they'll take that into consideration, of course, it's dependent on program name, but they're very flexible, and they want you to succeed.

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So, in summary, overall, what you're doing is medical operations, you're supporting training, crew training, certifying the astronauts and make sure that they're safe to fly. And that if some medical issues come up, you get together as a group with the flight surgeons, and then you work through to make sure you get the consultations that they need the medical test and imaging that they need to make sure that they're safe to fly. You can work clinic, you can see the astronauts, the retired astronauts. And also, you can work on project either on SANS project, there's a co2 project, there's an Orion project, this gateway that you can be assigned to, there is neutral buoyancy lab, there is fatigue management sleep, there's flight roles, there's so many things that you can participate in, just depending on your interest, and depending on the program need. And then a big part of it is going to Russia to support Star City training, crew training. And you could be in Moscow to be the Moscow physician as well. And you would be traveling all over if you're assigned to a crew, then you're traveling with them through their training for the mission can take one to two years. And you could be assigned to what they call private astronaut missions. So, the people who pay to go into space, and they're right now trying to come up with the medical certification criteria for those astronauts and it's pretty awesome. An amazing time, because it's just, the space travel with commercial space really is only just going to increase and explode. So again, I hope you have received some value out of this.

And if you have any questions, or if you want to see all the links that I described, all the resources I've described in this three-part series, just go to itsnotrocketscienceshow.com and askdrantsung.com if you have any questions at all. I will be very grateful if you could subscribe to my channel and leave a review or give me your feedback because I'm always striving to improve this podcast and I want to serve you. So again, just remember that everything you need is within you now. So, if you have a goal, not just a flight surgeon, but any goal that seems out of reach to you just think of the next step, find the resources, and do that next micro-step. We can do this. Thank you again, and have a good day. Bye-bye.

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Announcer: That's it for today's episode. Head on over to iTunes and subscribe to the show. One lucky listener every single week that posts a review in iTunes will win a chance in the grand prize drawing to win a private VIP Day for a health and life makeover with Dr. Ann Tsung, herself. Then, be sure to head on over to itsnotrocketscienceshow.com and pick up your free gift from Dr. Sung. Then, join us on the next episode.

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Transcript

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