AirSpace Season 6, Ep. 9: How Do You Sleep?

Nick: Yeah. Picture trying to sleep for two weeks in a Karmann Ghia without rolling down the windows or opening the doors

Emily: In a what?!

Nick: Karmann Ghia?

Emily: I don't know what that is.

Matt: Nobody knows what a Karmann Ghia is! Come on.

Emily: Is it like a smart car?

Nick: Well, then let's bring it back.

Matt: It's like the most obscure Volkswagen ever built

Music up then under

Emily: Welcome to AirSpace from the Smithsonian's National Air and Space Museum I'm Emily

Matt: I'm Matt

Nick: and I'm Nick

Nick: Every night for more than 20 years people have been asleep in outer space. Sleeping in space goes back almost as far as people in space to a cosmonaut in 1961.

Emily: Astronauts have slept in capsules, shuttles and space stations, usually in sleeping bags, but sometimes on the ceiling, in the airlock or wherever else they feel like it. When you're floating, anywhere can be your bed!

Matt: We spoke to a shuttle astronaut about catching Zs in zero G. To sleep in space, perchance to dream in space, today on AirSpace presented by Olay.

Music up then out
Matt: So today on the International Space Station, we have images of how astronauts sleep

there. And we know that they have sleeping compartments which aren't exactly the most well-appointed sleeping compartments that kind of like closets that astronauts are able to sort of shut themselves up in to get away from the rest of the crew and all of the activities and sort of take their turn at sleep, but it hasn't always been that way.

Nick: Yeah. Where we're starting in the moment and the ISS does have more specialized sleep chambers than previous programs, and we'll get back into the primitive old days pretty soon. And if you're envisioning something that you would buy at IKEA and then try to sleep inside, that's actually not too far from like the three dimensions of it. Although we should note, it's anything but basic. This is the most expensive object human beings have ever produced. So yeah, it's just a closet. But very, very, very posh. If you're counting the dollars and cents.

Emily: European Space Agency astronaut Samantha Cristoforetti gave a video tour of the crew quarters a few years ago.

From ESA Video
Samantha Cristoforetti (over backing music): Come on, I'll give you a tour! As you can see, there isn't a whole lot of space in here. It's really just the space for, for our sleeping bag and for us to sleep. And then for a few personal items and stuff of. Of regular use.

Matt: Now, in case you're wondering, astronauts don't spend a ton of time in those little sleeping quarters. Just the time that's necessary to get the rest that they need. But as you could imagine, it's very necessary that you get rest in space.

Emily: We did an episode, a season back or a couple of seasons back, where we talked about self-care in space and how important it was not just for astronauts to get appropriate sleep, but also for astronauts to have some downtime to sort of pursue some of their own things that are not necessarily work related. For a lot of astronauts, that includes their physical fitness regime in order to stay healthy in space. But a lot of times it's sitting in the cupola and taking pictures or reading a book or watching a movie. Sleep is just as important as some of the other self-care routines that astronauts engage in when they're in space. But I think it's hard for me to imagine what it's like to sort of tuck yourself in at night in a place where there kind of isn't really an up.

Samantha (from ESA Video, with backing music):
And of course, we have our sleeping bag. I usually roll it up during the day so that it's not in my way. And then when it's time to sleep, (*sleeping bag noises)* I open it up and then I can slide in. Some people leave it open, but I'm, I'm always a little bit cold, so I like to zip it up all the way. And then some people like to tie themselves, but I actually don't. I really like to just float when I'm sleeping. So that's really it. I would turn the light off and good night! *lullaby music takes us out*

Matt: So, you know, ISIS isn't the only space station out there. There's also now a Chinese space station called Tiangong. And the main module, the Tianhe module, which went out last year, is already operating, has already had multiple crews on it. And so there are astronauts sleeping on that station as well. And as I've seen the sleeping quarters in one image that I saw online somewhere next to the astronaut and their sleeping, uh sleeping bag is a window out into space. Can you imagine that sort of sleeping quarters with a view?

Nick: Yeah. So a little bit of personal space, a little bit of meditation, you got to see the earth outside your window. It's really kind of this wonderful place to be, even though you're really only there in a utility sense. You're getting maybe a smidge of personal time in the middle of your big workday. And then it's really just so you can get the rest that you need to continue with the mission. Not so in the shuttle era. The shuttle did not have the little sleep closets that we're discussing now. It was a whole lot more of a free-for-all.

Dr Mike Massimino: So the space shuttle was kind of like a slumber party.

Nick: That's astronaut Dr. Mike Massimino. Who flew two Hubble service missions STS 109 and STS 124 for a total of 24 nights sleeping in space.

Mike: We all were, we were all of us were in sleeping bags. We did not have on, on the missions, I was on, there were some missions where they had sleep quarters. Those were typically for 24 hour around the clock operations for some Spacelab missions. We didn't have those. We were all on the same shift. So we woke up together and went to bed to sleep at the same time.

Emily: Right. And it's worth noting, you know, you sort of have the shuttle era that kind of leads us into the space station era, right? Like we didn't always have a space station because we had to, it took a lot of time to build it. It's one of the reasons why sleep in space has changed over the years. Is because the facilities that we have available, right, having a bedroom, takes space, shoot, I don't even have a bedroom in my apartment. I live in a studio. I'm actually kind of jealous of this Chinese space station. With windows near their bedroom because I don't have one. But it's still really important to keep in mind, as Nick mentioned, like, you know, you're in the shuttle era sleeping in space, and the shuttle era evolved into sleeping in space in the ISS Era.

Matt: And I think, you know, a lot of people are deceived when they see the space shuttle into thinking that there's a lot of space inside of the shuttle. Right. Because it's a big vehicle. But the majority of that space is not pressurized. It is the cargo bay. And so the actual crew compartment in the nose of the shuttle is a pretty small space. It's just a mid-deck that's basically just a small
room. And then up a ladder from the mid-deck is the flight deck, which is even smaller. So the whole thing is larger than the capsules that we sent to space prior to the shuttle era, but still small

enough that that crew can't really get away from each other when they're trying to sleep or or have some time to themselves.

Nick: Yeah, the ISS is bigger than a breadbox, the whole thing is about the size of a football field. So there is space for dedicated space for sleeping. And Matt, you make a good point, the crew compartment in the shuttle is much smaller than you would think just looking at the spaceship. But that brings us to an interesting point as we go backwards in the Land of Nod, you can utilize all dimensions of the space. The full volume of the crew capsule is available to you on the space shuttle. So there are no dedicated sleep quarters, but that also means no rules,

Emily: *laughing* no rules…

Matt: *laughs* Right. And like Emily said in the billboard, you can sleep on the ceiling or the walls or wherever you want.

Mike: So we were kind of like, as I said, a big slumber party where you would set up your sleeping bag during the pre-sleep period, which means, you know, brush your teeth, get ready to go to bed, period. And you could set them up anywhere you want. Typically, the commander and the pilots slept on the flight deck. I think I spent one night up there with those guys, kind of like a sleepover up there with those guys. But the rest of the time, I was on the mid-deck with the rest of the crew. The sleeping bags were kind of like bedrolls that you would roll out and you could set it up just about any place they had hooks on them that you could always find places to little areas, different things, you could hook your, those hooks up to and then float inside of the sleeping bag and get some sleep. I typically try to put mine on the ceiling because I thought that was kind of cool. You know, you can sleep any way you want, so but that's the way we did it. So there were typically five of us in various locations on the floor, on the walls. John…John Grunsfeld, used to like sleeping in the airlock. And the pilot and commander typically upstairs in the flight deck.

Matt: So the other thing, I mean, what always strikes me about trying to sleep in space is how the hell can you even do it?

Emily: *laughs*

Matt: Right. You're at least I would be incredibly excited about being in space in the first place. And I can't imagine that I would sleep for at least the first few days.
Mike: Yeah. The major one is that you're kind of excited about being there. So, you know, everything's new The the first couple nights, I never take sleep medication on Earth, but in space, I did take a little bit of it just for the first couple of nights, and then because I wanted to make sure I got my my rest. But after that, I didn't I didn't need that, but I didn't have I just, you know, you find yourself being very excited on on launch day when you get to space, it's just kind of

hard to go to sleep, especially the first of my very first night in space. Everything was so new and and exciting. And I don't know what the heck was going on. And so it was, you know, it just a little, little took a little time to get used to it.

Matt: All right. We've said this a couple of times now where we've alluded to there being sort of nights being spent in space and people sleeping in space. But the truth is, people have to sleep on completely invented schedules in space because you're witnessing multiple sunrises and sunsets every day from orbit. You're trying to sort of stay in sync with the people on the ground. But in the case of some things like the International Space Station, there's multiple ground stations.

Emily: Well, no, Matt, you're totally right. To put it into perspective. You're talking about one sunrise and one sunset every 90 minutes, which means if you're trying to sleep, let's say let's say you're going to get an eight hour sleep and I'm jealous of you, but if you're going to be an astronaut and you're going to be on your toes, you've got to get good sleep. So let's say you're going to get an average of 8 hours per night. That's a lot of sunrises and sunsets that you have to sort of sleep through. You're kind of manufacturing a sleep environment because you're not going to bed after it gets dark and waking up as it starts to get light out. Like that's just not going to work.

Nick: Yeah. So bedtime on the International Space Station or in the Shuttle is kind of dependent on the needs of the mission. Now, you started out on the ground, so timing it so that the launch comes at the beginning of your day can also be a little bit of a challenge. So there are kind of sleep protocols on the ground too, where the astronauts will adjust their, adjust their body to the mission clock a few days ahead of time, kind of like living on London time if you're going to cross the pond for, you know, work, pleasure, what have you. Take it up with customs. So nowadays the ISS clock is on Universal Coordinated Time, which is also Greenwich Mean Time, which means that American East Coast astronauts have to jump forward 5 hours when they prepare to go to the ISS. And once the astronauts are back on the ground, they have to make that jump backwards. And very importantly, they have to remember that they are no longer sleeping in space.

Mike: On Earth though too, like you've got to be careful. Your first night coming back when you're back on the planet and you go to sleep and you're kind of used to at that point after a while being in space and sleeping and waking up in space and kind of waking up and floating out of your sleeping bag, kind of half awake. And you don't want to do that when you're on Earth. So you got to be really careful that first night that you don't think you're still in space and try to float out of the bed because you'll end up on your on the floor. That almost happened to me, but I was able to realize where I was before I actually plopped on the floor.

Music button

Emily: As the non-music file in the co-hosting team here I'm still really excited about the fact that most missions use music to wake up their crews.

Mike: The way we were woken up on the shuttle was they would play music, we would have wake up music, which was a tradition with the Space Shuttle that each crew member would get one song during the flight to wake up to. Typically on a day that was like their 'big day,' whether it was rendezvous for the commander or the spacewalk for the, you know, one of the spacewalkers and your family usually had a hand in picking that out, what music it was going to be. And so that's what we would we would hear you would always hear like kind of like the the satellite comm coming in over the speaker, kind of like kind of scratchy, kind of like kind of *chchchchch* kind of noise as you were acquiring the satellite connection as they turned on the communication. So they, so you could hear them. And and then you would hear like a quindar kind of *baaahpp* kind of thing. And then and then the music would come on and and then based on whose song it was you that that crew member would usually thank you very much for the song, blah, blah, blah. But that's how we would get up.

Nick: Yeah. So clock radio in space beginning with Gemini 6 in 1965 astronauts have had a melodic morning thanks to Mission Control.

Emily: Right. And apparently Gemini 6 got a parody version of Hello Dolly which I'd really like to hear.

Nick: And Matt will sing it for us now.

Matt: Oh God no.

Nick: I would but I don't know the tune.

Matt: You don't know the tune of Hello Dolly?

Emily: Oh I know the hello, I know the tune of Hello Dolly. But if it's a parody like…
Nick: Emily, take it away.

Emily: Not a chance
Matt: It would be like, *(Hello Dolly on piano comes in) sings*

Hello Wally, this is Jack Jones
Wally, it's so nice to know you're up where you belong.
All systems go, Wally, you're 4-0, Wally

Laughs Tom, all that's Navy Jazz for razzmatazz

Razzmatazz! You know,

Emily: That was good! *Claps*

Matt: just the use of the word razzmatazz. I think they get points for that.

Emily: That was. I mean, you hit more notes than I remembered, so well done.

Matt laughs

Matt: Well, you know, and, you know, mission control typically chooses the songs, right? If you're the one who's who's flying his up in the ISS, as sometimes maybe you get to put in requests, but it's mission control who gets to kind of, you know, decide whether they want to wake you up humorously, energetically, you know, with a mosh pit or whatever they choose, right. And it's something that's really interesting. It even carries over into robotic missions. They use wake up songs for the rovers on Mars as well, which I think is kind of cute since the rovers don't, as far as I know, have any appreciation of music.

Hello Dolly piano flourish music button

Nick: let's let's get even wilder. Let's go let's go back further. So the first person to sleep in space was guaranteed of he was a cosmonaut on Vostok 2 in August of 1961.The mission was just over 25 hours long. Matt, to your point about being excited, he slept for more than 8 hours!

Emily: *gasp* Wow! I can't imagine

Nick: The dude got like, more than a standard night's sleep in his one day in space.

Matt: So poor Titov was actually sick during a lot of that flight and that's why he

slept.

Nick: Yeah. Ignominious, ignominious part of the first person to sleep in space. He was also the first person to get sick in space. So he, he needed it. He was just kind of sacked out on the couch with like hot water bottle..

Matt: Hot water bottle?

Emily: *laughs*

Nick: …blanket like it up to his chin. A cartoon thermometer.

Matt: I mean, maybe an extra an extra thermal blanket for him.

Nick: And this is a this is fun. The first American to sleep in space was Gordon Cooper Mercury Atlas 9 in May of 1963. That was the last of the Mercury missions. Cooper orbited 22 times and slept intermittently for a couple of orbits for about 6 hours which is honestly like that's more reasonable you realize that you know you're excited except the other famous thing about Gordo is that he fell asleep on the launch pad during the countdown! NASA brass was not amused. So Gordon Cooper pretty relaxed about it all.

Emily: But did they keep him there for a really long time?

Nick: Actually, apparently it was like it was more just the way that he was they called him a strap-it-on-and-go astronaut. Like he really wasn't concerned with the technicalities. So like, I'm sure he was up there for a long time, but also he fell asleep on top of a missile on a launch pad, like right before they shot him in space.

Emily: And one day when we finally get to do my movie episode on the movie The Right Stuff, we will talk about their depiction of Gordo falling asleep on the launch pad because it's in the movie, too. Everything's in that movie, I'm telling you.

Nick: Oh, yeah. That's why the movie is 16 hours long.

Music button

Matt: So it was inevitable that as these missions got longer, more complicated, people were going to need to start sleeping more regularly in space. And it was a challenge for NASA at first to figure out how do you actually get your astronauts to sleep and do all of the tasks that you're asking them to do at the same time, right. How do you balance the sleep schedule with the work schedule in space?

Emily: Right. And so most of the Gemini crews slept in space after about Gemini 4. So we had two astronauts and a pretty small capsule, and they slept in shifts so that one person would stay awake to talk to Mission Control and deal with anything that came up. But the problem is that this is a pretty small capsule because it's only big enough for two humans. And so if somebody had to talk to mission control, the other person was inevitably going to get woken up. Anyways, so during Gemini 5, which I know you all will be surprised to find out, was after Gemini four, the astronaut sort of took it upon themselves to start sleeping at the exact same time because they

were kind of fed up with this whole like, I'm going to I'm going to get some, I'm going to get some sleep while you talk to Mission Control over there and totally interrupt it.

Matt: Yeah. And by that point, I think there was enough confidence in the sort of the spacecraft systems that Mission Control felt like they didn't have to constantly be checking in with the astronauts every 15 minutes to make sure that everything was working properly. I think astronauts, astronauts took the first step in initiating that, but Mission Control followed their lead and decided, yeah, it's probably good if we give them some quiet time to sleep every now and then.

Emily: So we've got some cool archival flight audio of Pete Conrad, who's the Gemini 5 mission pilot, talking to the flight surgeon in Carnarvon, Australia,

Archival Audio
Carnarvon Flight Surgeon: Gemini 5, Carnarvon Surgeon. Houston surgeon is a little concerned about your lack of sleep. We'd like a status report on each of you at this time concerning fatigue level. Over.

Pete Conrad: Roger. We've just been catnapping and about 40 minutes on and 40 minutes and 40 minutes on, 40 minutes off.

Carnarvon: Roger have a busy flight plan ahead. We recommend you try to sleep during your program sleep period if you can, so as not to get behind on the fatigue curve. Carnarvon surgeon out

Pete: We're trying to, but you guys keep giving us something to do.

Carnarvon Cap Comm: Uh this is Carnarvon CapCom. We're standing by, everything looks good on the ground.

Nick: OK, so now, now let's go to the moon gang! So by Apollo8 NASA was still working out how the sleep schedules worked best for like the super long duration, like deep space flights. Apollo 8 was the first mission to leave low earth orbit and travel to the moon and part of the
things that they were testing out was how sleeping was going to work on lunar flights. Frank Borman, the commander and the voice in this recording, was communicating with CapCom in Houston when each of the crew members would be asleep as they took navigational angles on their way into lunar orbit.

Archival Audio-Apollo 8

CapCom: So the big message is that we'd like to work around whatever your desires are. If you'll let us know, we'll pick some starsand some angles and have them ready for you.

beep

Frank Borman: Okay, Houston. The CMP will be up at 3-6, 36 hours.The LMP is going to sleep now, and he'll sleep through until 40 and then I'll stagger that in and try to go to sleep around 30, 37 so that by the time we get to day three we'll all be back on the same direct sleep cycle.

CapCom: Okay, real fine. Thank you.

Matt: And one of the reasons he was able to do that too was that they were now wearing headsets so that if one astronaut was talking to ground control, you know, not everyone had to hear what ground control was saying and if you've listened to any of our previous seasons, you may know that the Apollo astronauts also for the first time carried Walkman with them to space and now could put on their own little headphones and listen to music whenever they wanted to. So who knows? Maybe some of them were sleeping while listening to music.

Nick: So and Apollo was another time when you get the full volume of the spacecraft, the Apollo command modules weren't huge, but they were huge compared to like Mercury and Gemini. So some of the astronauts actually chose to sleep underneath the seats because when you have no gravity to bother with the space underneath the couches, that you sit in to launch is actually it's pretty big. They could do flips, they could stretch out a little bit.

Matt: One interesting thing about this is, you know, ever since those capsules came back to Earth, right? We've of course, dealt with them only in the context of Earth's gravity. And that includes the conservators and the curators here at the museum. But a few years back, when we did the 3-D scanning of those capsules, we kind of made it digitally so that you could float around the capsule and we finally got, you know, the same view of that area under the seats that that the the astronauts had. And it is, it does look a lot roomier when you're under there than it does from above.
We'll post the link to that 3-D scan of the Apollo 11 command module on the social medias
Nick: Things get a lot more spacious when you don't have to worry about gravity. So let's worry about gravity. It turns out sleeping on the moon was a huge challenge going back into the collection, as Matt was just talking about a few years ago when we collected something known now as the Armstrong purse, which was a bag of kind of miscellaneous spacecraft parts that Neil Armstrong had kept in a closet. And his wife donated to the museum. One of the things that we found was a little utility strap. And by looking at the hook on the utility strap, we found paint from a handhold in the ceiling and realized that because they had not planned on how to sleep in the lunar module and because there were no seats in the lunar module, Neil and Buzz had

actually rigged, not quite a hammock, it was literally just a strap that Neil used to keep his feet up off of. Buzz like it was really primitive. And allegedly they did not sleep well. I mean, yeah, they were excited. But also, this is Neil Armstrong. So you think he could sleep anywhere? It was not very comfortable.

Matt: Well, and the other the other problem was that there was a noise, they couldn't figure out what it was while they were trying to sleep and it bothered them to no end. They kept hearing this sort of I think it was sort of like a dinging, grrring noise.

Nick: *Rrrrrrr, Grrrrrr*

Matt: And it turned out it was just the noise from the water cooler making that noise all night long. But they were like "Oh, my God, something might be wrong with the spacecraft! How can we be sleeping?"

Nick: Yeah, the water pump freaked out Al Bean on Apollo 12 as well. And it's just as well that he was awake because back in Cape Canaveral they had laced Pete Conrad, the commander's, boots too tight, so tight that it was pulling on the shoulder of his spacesuit so he couldn't sleep either. Al Bean was mostly awake, so they actually had to both get up and release Pete Conrad's boots so they didn't sleep particularly well. Apollo 13 clearly no one was getting any shuteye. And then poor Apollo 14 landed on a seven degree tilt. So it was just a really not very conducive way to get, get a night's rest. It really wasn't until like the later Apollo flights that sleeping on the moon became as comfortable as you would want it to be in one-sixth gravity.

Music up then eunder

Emily: AirSpace is from Smithsonian's National Air and Space Museum. It's produced by Katie Moyer and Jennifer Weingart. Mix by Tarek Fouda.
Did you know that AirSpace has a monthly newsletter? You can sign up through the links in the show notes and follow us on Instagram and Twitter @AirSpacePod.
AirSpace is presented by Olay and distributed by PRX
Music up then out

Emily: Sounds like the worst camping thing ever because it's like really exciting and you, like, can't just like pop outside for like a walk when you can't sleep.

Nick: Weird smells unpredictable humidity.

Emily: Nobody having bathed in like four days got a little rank in there. A little gamey.

Matt: I think it was, I think it was Jim Lovell who described his time on his Gemini mission as like having spent a week in a porta potty or something like that?

Emily laughs

Matt: *laughs* It was like terrible.

Nick: Yeah. Having spent a week in a porta potty with a ,with a buddy and I think it was a Lovell mission. It might have been the one that he was referring to where when they opened the hatch, the Navy Frogman who was there to help them get out of the spacecraft and into the raft fell backwards into the water because the stench was so incredible.

Matt and Emily laugh

Matt: Oh, I can only imagine. Yeah.

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