[Intro music]

Kirk McDaniel: Humans are destined for the stars. Every year, there are new advancements in technology, more investors are willing to foot the bill for projects that bring us closer to traveling deeper and longer into space. Science fiction is rapidly becoming science fact. However, one thing that is rarely discussed in your favorite sci-fi movies is the laws that govern outer space. Welcome to season three of Sidebar, a podcast by Courthouse News. I'm Kirk McDaniel, Sidebar's producer and your host for this episode. My colleague Amanda Pampuro has ventured out in search of the laws and regulations that guide human activities beyond the atmosphere. She has returned to Earth and is excited to share her findings.

Amanda Pampuro: Kirk, can you believe it's been 54 years since we first landed on the moon, and we haven't been back for 50 years?

KM: It's crazy to think that it's been that long since we first landed on the moon.

AP: The tread from Neil Armstrong's boot print is still there stamped into the silt.

Neil Armstrong: That's one small step for man, one giant leap for mankind.

AP: The moon doesn't have wind or rain or humans. But if billions of dollars of investment, dozens of political manifestos and decades of Trekkie dreams come to fruition, that is about to change. There is nothing protecting man's interstellar impression. No brass plaque. No velvet rope. No laws.

Michelle Hanlon: I was a child of Star Trek, I've always loved space, and I'm one of those children who sort of didn't feel like I was doing well in math, and so you know, crossed astronaut off my list at a very young age.

AP: This is Michelle Hanlon.

MH: And I'm the co-director at the Center for Air and Space Law at the University of Mississippi. My sons are both engineers, and both very interested in space, and so they sort of got me back into it. So, I went back to school at the ripe old age of 50 and got my advanced degree in space law at McGill in Montreal. So, when I was there, I was listening to a broadcast and Jan Wörner, who was the head of the European Space Agency at the time, was in China. And he has come up with the idea of this moon village, and we need a community on the moon that is international, that captures everybody, which is a great idea.

Jan Wörner: The moon village, we would like to combine the capabilities of different space-faring nations, be it robotic or be it human, to look also for different activities be it pure science, vis a vis business, tourism or mining or whatever to put them together on the same place.

MH: He was he was selling it to China, and he said at the reporters session, 'China, you know, we have to go back to the moon together, if only to take down those American flags.' Of course, he was joking. But I was like, wait a minute, you can't do that! And I looked up, thought about the laws, and this is one of the huge major gaps in international space law, is that, yeah, you can do that. There's nothing protecting heritage in outer space the way we protect it on Earth through UNESCO and the World Heritage Convention. It started really, honestly, with a little bit of a patriotic, you know, just like, wait a minute,

you know, we did that, that's an American thing, we need to protect that history. And it has turned very much into a universal thing, because if you look at how we got to the moon, you realize, yeah, it was 400,000 American engineers and factory workers and line people who build the hardware and all the stuff. But it was a millennia of human endeavor to get us there. And if you look at the records, you'll see that even the NASA engineers used formulas, you know, from Copernicus to measure stuff. So, the boot-prints, all the artifacts in the moon, including, you know, the Luna 2, which was the very first human-made object to crash land on another celestial body--

AP: --Soviet Cosmic Rocket launched September 1959--

MH: --and Chang'e 4, which is the first human object to soft-land on the far side--

AP: --Chinese spacecraft launched December 2018--

MH: --those are all really culmination of centuries of dreaming and working and understanding and learning. And so those footprints really reflect an entire millennia of human advancement. And we see that as, you know, a real reason to protect them. A lot of people say to me, oh, they should just be UNESCO World Heritage sites. So, the problem is you can only nominate a site that's within your territory, and Article Two of the Outer Space Treaty specifically says you cannot claim territory in space by sovereignty or by any other means.

AP: Most people are receptive to the idea of making ‘human heritage sites’ in space. The question is how? I’m told one of the issues the United Nations is considering taking up is human heritage sites like Neil Armstrong's footprint on the moon.

Kojiro Fujii: Yes!

AP: So, what are your thoughts on whether that should be protected? How should it be protected?

KF: People are in general, very favorable of such ideas. My name is Kojiro Fujii, part of Japanese law firm, Nishimura & Asahi and also executive committee member of legal think tank called Nishimura Institute of Advanced Legal Studies. But some people have concern that if each countries or companies or individuals are claiming their own cultural heritage, that the commercial activities could be compromised in a greater degree. So, in my view, the preservation of cultural heritage is very important thing, and we should pursue that, but at the same time, we need some sort of objective criteria to keep the scope of cultural heritage in a reasonable scope, making space a sanctuary is not a purpose.

AP: Are there any cultural heritage sites that have importance to you or to Japan?

KF: As early as next spring, the company iSpace now joined a project with SpaceX. I think their moon landers already launched by SpaceX rockets and now the space lander is approaching to the moon. And the next spring, if the operation ends in a successful manner, the first commercial vehicles are going to land on the moon. So, then Japan may think this is an important achievement and that the place of the lander and maybe the lander itself should be the cultural heritage, but this is just my personal view.

KM: I think most people are very familiar with conservation on the planet. Taking it to outer space seems so simple, but it is so much more complicated than I could have imagined. When you can't own the land beyond our own planet, how do you preserve it?

AP: When I learned that this was an issue, it blew my mind. Just thinking, wait, yeah, we do have human heritage in space, how do we protect it? What do you mean there's no way to do it? I think over the years a couple of Texas senators have tried to protect the Apollo site through Congress and they can't. Because Texas can think they own everything, but they can't own the moon.

KM: I'm telling you this right now, we're not big enough.

AP: Right? There are no laws protecting human heritage in space, but that doesn't mean there aren't any laws governing human activity. The Outer Space Treaty of 1967 is the constitution and it's one of those elegant, concise documents you can read between bus stops.

MH: So, the Outer Space Treaty is really a remarkable document.

AP: Michelle Hanlon, University of Mississippi.

MH: It was hammered out during the Cold War, which was continuously flashing hot. And yet, these white men all realized that they didn't want to have war in space, that it would be truly, really horribly destructive. And so that's why it's remarkable. And they did everything they could to reach an agreement. And they formed a baseline. There are an incredible amount of inconsistencies and gaps, but we have a couple of fundamental points that I think are so important. The first one is article one: space is the province of all humankind, free for exploration and use by all. Period. I mean, that's an incredible statement. Everybody can use space, there's very few restrictions, so long as you don't put weapons of mass destruction or nuclear weapons in space. And so long as you have due regard for each other.

AP: The treaty was signed six years after the U.S. and Russia each sent up their first astronauts, but that's two years before Neil Armstrong walked on the moon and a full decade before Carl Sagan's golden record launched out into the universe on Voyager. Like many things built in the 1960s, the treaty could use some updates. Not just how do you protect human heritage, but if you can't own celestial bodies, how do you lay claim to the resources you want to extract? And who is responsible for space junk.

KM: One thing I find really amazing about the Outer Space Treaty is that it's one of these documents that seemingly defies the politics of its time. And it feels so forward-thinking about the future and what's right, and what's just, and I think most people would agree that war in outer space is not a good idea. But like any document, you know, it seems like it's got areas for work.

AP: You can even think about like the United States Constitution, and how they wanted to create laws that would last into the future, and all of these problems that have arisen in the last 300 years that they couldn't have anticipated, and how people try to still interpret them through the Constitution. And it seems like that's how the Outer Space Treaty is also being used. In the 1960s, they couldn't imagine thousands of satellites or inactive satellites in space. This is the recycling era. Trash in space is incomprehensible. And yet that's the document we have, so people are coming back through that to interpret how do we move forward based on this. And I asked, almost everyone I spoke to, do we need the 1967 Outer Space Treaty? Is this document still valid? And they just immediately, wholeheartedly, said yes, this is fundamental. This is what we have. And we all agreed on it then. So, we're not starting over now.

[Space beeps]

AP: The Soviet Union launched the first satellite, Sputnik, into space on Oct. 4, 1957. Today there are thousands of satellites orbiting Earth. But there's this program called Wayfinder from tech company Privateer that shows you in real-time the thousands of active satellites, inactive satellites, pieces of rockets, debris and uncategorized things, floating around our planet.

Skip Smith: You go back to probably the 1980s, a NASA scientist by the name of Don Kessler came up with what was tagged the Kessler syndrome. And that would be cascading collisions of space objects.

AP: Debris collides with debris, making more and more debris. This is Skip Smith.

SS: My first career was as an Air Force attorney and was the lucky one selected to be the first Chief of Space Law at Air Force Space Command when it was established in 1982. We've already had collisions of space objects. Space is a big place, but when you put lots and lots of satellites up there, it can get congested. But what you want to prevent is collisions in space, because they create a lot of pieces, parts, and those pieces, parts are moving at 17,000 miles an hour or so, so they can be very small, but they have a high velocity and can do a lot of damage to another satellite. Can you imagine cars running around the city if there weren't traffic lights?

AP: I've been to Manila, I've seen that.

SS: You've been to Manila? I lived in the Philippines for three years. So, I've seen that too. Yeah, it's like, your life in your own hands. It is kind of dangerous and you have the same thing in space, you have the danger of objects colliding, so you want to manage that. Under Article Six of the Outer Space Treaty, nations have responsibility to authorize the space activities of their entities and to continue to supervise those entities and so we do that generally. But there's not many rules applicable once you're in space. Very few, if any, rules of the road, no traffic lights. They are no 'go slow signs.' People use the example of early aviation days, when it was like barnstorming and stuff. It was not much regulation back then. You can, you know, jump in an airplane and see if you can take it off, you know, and then hope you can land it.

AP: Do you think our legal system is able to keep pace with the speed of development?

SS: Well, that's an interesting question. Because some people think the law needs to precede the technology. And there are others that think, no, no, we don't want the law to impede the technology. So, the technology goes first, and then we'll bring in the laws and a good example of that is suborbital spaceflight now.

AP: Companies like Blue Origin and Virgin Galactic have taken tourists 66 miles up over the planet. That's six times as high as an airplane, high enough to see the curvature of the Earth and experience a few minutes of zero gravity.

SS: The FAA regulates airlines in great detail for safety issues, almost everything is regulated. On human spaceflight, now, it's almost a hands-off approach, other than requiring everybody who goes up to sign that they've been informed of all the risks, and they consent. I represented one of the private astronauts that went to the International Space Station last April. It was the first mission to the Space Station that

was all commercial, and it was three astronauts who were paying to go, a published price in the $55 million per astronaut range. The mission was put together by Axiom Space out of Houston which had a contract with SpaceX to launch the astronauts and to bring them back and had a contract with NASA to host them on the International Space Station.

AP: I am curious, I remember you saying that the waiver for the astronaut was one of the longest and ticked off everything you could think of that could go wrong.

SS: Well, yes, because one of the things that's kind of standard for space activities when humans are involved, you're going to have a launch waiver. And if you are returning a space object, you will have a waiver applicable to the return. If you have humans on board, you're going to have an informed consent from the folks that are going up. They have to be told all the dangers, all the bad stuff that theoretically could happen. And then they have to give their informed consent in writing.

AP: Well, that's great, everyone who goes to space is going to need their own private attorney to help them review the paperwork.

SS: And I volunteer.

AP: Anyone with $55 million and a legal team can go to space, but the U.S. is still starting to pour the foundation on which to build future laws.

Michael Dodge: The U.S. has a very strong and effective air traffic management regime, that's been sort of adapted and spread throughout the world. Hi, my name is Michael Dodge. I'm an associate professor of space studies at the University of North Dakota. There was a law passed in 2015, the Commercial Space Launch Competitiveness Act, by a Republican Congress and a Democratic president, a lot of bipartisan support for this, and it did a lot of things for outer space law. But one of the things you see in it is that the United States government, Congress is probing. It's clear to them that they don't know who should be in charge of orbit management activities.

AP: Preventing space junk collisions.

MD: They don't know who should be in charge of keeping debris from being a problem, because they repeatedly ask various federal administrations, you know, if the FAA or DOD or whomever, we want you to tell us who do you think should be in charge of organizing this kind of debris situation keeping track for the future, and so on, because they need to know what that should be so that they can create a law to 'make it so,' to use Jean Luc Picard's phrase.

Jean Luc Picard: Make it so.

AP: Do any space law issues keep you up at night?

MD: You know, yes, I would say that, for me, the issue that keeps me up at night is anti-satellite testing. ASAP tests are these sort of military chest-beating exercises, as it were. And I know that a military planner might say these are necessary for us for national security, and I understand that, but the United States and the Soviet Union conducted many such tests during the Cold War, and then stopped by and large for a really long time. They realized we can do it, and it's creating a lot of debris, there's no good reason to continue. But in more recent years, China has been attempting to emulate everything that the

United States and the Soviet Union did to show that it's a player too, and so it blew some things up in outer space and created a massive, massive cloud of debris with many thousands of pieces of debris that have consistently threatened the use of outer space for years and years, including the International Space Station which has had to move to avoid that debris before and then Russia more recently, in a more aggressive military state of mind as you might imagine with things going on in the world, did something very similar. We've seen a test recently from India as well. It seems like there's a trend that I have to show that I can hit your satellite with my weapon too, as part of my national security strategy. And that's very, very dangerous. It's really dangerous as more and more states gain access to rocketry and the expertise necessary to accomplish something like this. If this trend continues, we could see an increase in orbital debris, which could be problematic for everyone's use of outer space going forward. Let's hope that that doesn't happen, but it's certainly a concern.

KM: So, you're telling me that there is a huge amount of space junk flying around above our heads faster than a bullet?

AP: The euphemism they like to use is orbital debris. But space junk is so much more evocative and makes you realize that yes, there are tens of thousands of pieces of metal flying around our planet, there is nothing really stopping them other than physics from crashing into Earth. And I know our editor is terrified of something the size of a bus crashing down in the middle of a city street.

KM: So, who's going to space right now? I mean, who's passing beyond our atmosphere and beyond our, you know, collective orbital debris, and headed out into the great beyond?

AP: A lot of corporations are driving our return to space. From the U.S., we have notably SpaceX and United Launch Alliance sending up a lot of rockets. But really, every nation capable of going to space has an industry of tech startups trying to get up there to mine asteroids and explore tourism.

KM: It sounds like from this next segment, whether you like it or not corporations' presence in space is here to stay?

AP: I started researching this episode wondering whether humans could make a fresh start in space without bringing our garbage with us. Then I learned very quickly that's all already a real-time, present problem. Militaries rely on satellites to fight war, and we already have tens of thousands of pieces of trash just floating around. But I still have to believe – and a lot of people working in this industry believe – it's not too late for space, that we're adapting as best we can. Starting with our laws. Here's Kojiro Fujii.

KF: So, last year, Japan legislated a space resources law and it also made possible that private companies exploring the extract space resources. At the same time, it's emphasized the importance of harmonizing. It's Japan's effort with international orders and laws and their cooperation with other countries. In order to achieve that Japan is building the capability of authority to review and approve the plan to space mining activities. Second interesting trend is the multilateral efforts to building the principles of space and natural resources exploration and the part of the Artemis Accord which the United States and Japan and Canada, UK, Italy, Australia, Luxembourg and UAE, those eight countries agreed to the basic principles of the space resources exploration.

AP: The Artemis Accords were signed on Oct. 13, 2020, with a promise from NASA to return to the moon. There are two reasons that date is significant: one, we were in the middle of a global pandemic,

so it’s a signal to the rest of the world that we can do this together. The second reason is that six months earlier, then-president Trump signed an executive order in part declaring “the United States does not view [space] as a global commons.” So, on the one hand, you have the Artemis Accords offering to lead the world back to the moon, and on the other, you have Trump saying--

Donald Trump: --America first.

AP: Even though it’s not a law and it’s not a U.N. treaty, Artemis starts to fill in the blanks left by the Outer Space Treaty, calling for international standards on equipment, registering space objects, protecting historic sites, and making legal framework for resource extraction. Is there continued debate about whether mining is even permissible under the Outer Space Treaty?

Avishai Melamed: There is continued debate. I'm Avishai Melamed. I'm a graduate fellow in Cornell University's Tech Policy Institute where we study technology and its role in domestic and international politics. The Outer Space Treaty’s article two specifies that you're not allowed to claim territory. But there are some ambiguous terms like it bans the use of certain things in space. And so, some ask what constitutes use. Is it use if I'm using something in space? Or is it use if I bring it back from space? And so, well, we haven't had anyone ever question that we brought back lunar rock samples as legal or not. There is the argument that, for example, when we go fishing in the ocean, we're not claiming the ocean as ours. On the other hand, there are concerns that this kind of behavior would lead countries to, if not du jour, de facto create these quasi-territorial units where they want to extract resources from a specific location and for safety reasons, stop other countries from extracting resources from that specific location.

AP: That word safety is important because the Artemis Accords look to establish safety zones, both around mining operations and human heritage sites. Creating the first fences in outer space. Do you think the Artemis Accords provide a good framework for the world to move forward into space?

AM: They certainly can, but they don't do so inherently. It asks states to sign on to some very responsible standards of behavior. On the other hand, the Artemis Accords also asked states to support an interpretation of space law that some consider a bit risky. It provides an interpretation of the Outer Space Treaty, supports the extraction of resources from space, then, as you might guess, that serves resource extractors and benefits for sort of competitive behavior, not necessarily the broader international community.

AP: The 21st-century space race is not driven by scientific inquiry or tourism. Startups and investors are pouring billions of dollars into rockets because there is gold out there – literal gold, water and other resources that could be worth zillions of dollars. That’s an important shift: space occupation by private enterprises instead of government agencies.

AM: When private actors take a more prominent role, they do have different preferences from the traditional actors we’ve seen, both state actors and their kind of key partners, a bit more traditional space companies. These new actors are very profit driven rather than looking at the broad national interest sometimes, and we don't want to risk prioritizing commercial applications over things like sustainability. We've also seen questions of things like intellectual property come up. Government programs like all the way from Apollo applications, NASA was known for kind of making some of its technologies and discoveries open for utilization by companies in the broader community, and we don't necessarily expect the same if companies take a broader role, because you know, intellectual property

rights may lead them to try and preserve some of their own specific advantage, and that can restrict the growth of very useful space activities.

AP: Shifting from government-led programs to market-driven space is creating a lot of growth and a lot of opportunities.

Kelli Kedis Ogborn: It's actually one of my favorite topics to talk about. I'm Kelli Kedis Ogborn. I'm vice president of space commerce and entrepreneurship at Space Foundation. Our space race started in 1957 with the launch of Sputnik. And at the time, the United States and the USSR were really competing for dominance, so space at that time was really a proxy of national posturing. And what was interesting about it is that technological maturation and exploration was just a byproduct of that. Now, as you mention, the budgets and the interest in space, it's not just anchored in posturing, because advancement and technological maturation has really evolved past that. And so gradually, you had commercial interests, commercial investment, agile, young companies coming in, that weren't necessarily anchored in nationalistic space programs, but saw adjacent problems that they wanted to fix. And we're at a place now, where commercial spending is at least fully double what government spending is. I think last year, there was about $10 billion of private investment put into private space companies. I always say that we're bookended in this Apollo era, and then we're moving into this era of Artemis. And what's interesting about the era of Artemis is that it has to be both collaborative and competitive in order to succeed because you're now seeing, you know, global governments and commercial companies working hand in hand to achieve this collective wish. It's going to require people bigger than the United States, bigger than commercial companies, and so it requires a different framework, a different way of thinking, and really a different posturing for people wanting to engage in space.

AP: Starting with space mining?

KKO: Space mining is one of those areas that is a really good example looking at the future space economy, because it's one of those that really drives the interest in investment because of the potential output. However, it is still very altruistically driven, because pragmatically, we're not close to being able to mine an asteroid and bring things back to Earth, but people are working on the problem. You think about beyond launch, in order to have space tourism, you need everything from seamstresses to create spacesuits to keep everyday citizens safe, robotic orbital assembly, hospitality, real estate, I mean, you really start to peel back the onion and get this creative approach to what space brings to the future.

AP: Down to the lawyers who have to draft the waiver.

KKO: One thousand percent! I always tell people that it really takes a village. So, when you think about space, your mind always goes to rockets and satellites and all these interesting things. But if you took a broader snapshot, you would see everyone supporting it, everything from like you said, like the lawyers, but even like food services or fleet management, right?

[Music break]

KM: You know, what strikes me is that, you know, humans are kind of predictable, what propelled us to find, you know, what was called the New World was an interest in trade routes to India. Sometimes it's the money that propels us to go to particular places, and we don't quite know what we're going to find

there, or what's already there. But it's, just the fact that we're propelled by that, by that I mean, it is very interesting.

AP: Totally, if Europeans hadn't wanted spices, we would not ever have left our countries.

KM: I will say, I am not the most well-educated about the first mission to the moon. But I feel like of that era, it was sort of a, we want to do it because we think we can do it, you know, and we want to prove that we can do it. And now that we've had, I mean, decades upon decades of space travel, that framework has now changed from yes, we can do it and our mission to do it is more than for humanity but a mission for resources and the good of a corporation.

AP: The Artemis Accords pave an avenue for legal space mining, but they also fulfill the U.S. vision of being a leader in space. While two dozen allies have been willing to follow the U.S. and sign on, other global superpowers – Russia and China – are charting their own path outward. That worries a lot of people, but not everyone.

MH: People say, well, the Artemis Accords, but then you have China and Russia, and they're gonna have their own base on the moon. I think that would be fabulous. We can have an Artemis base. And a Russia-China lunar base. Because you know, what's gonna happen is they're gonna need each other. And somebody's gonna say, oh, I'm gonna go over to the other base and get the oxygen I need, and some government idiot down here is gonna say, no, don't do that. We're not talking to them. And they're gonna do it anyway. And we're gonna learn from our spacefaring humans how to relate to each other here on Earth. I've had the honor of meeting Apollo astronauts and shuttle astronauts and they really do say things like, the farther away you are, the closer you are to each other. And, you really look down and wonder what we're what we're doing down there, like, how stupid can we be. And I think the more and more people we have doing that, and bringing back those ideas, the better.

AP: Generations inspired by Star Trek and Gundam are actually sending us back into space – though not for the good of all mankind, so much as what’s good for the market. Over the next 10, 20 years, we will increasingly look to space for resources that are rare on Earth. More people inevitably leads to more problems, but also more innovation, more collaboration. And as we’ve seen spacefaring technology improve our lives, perhaps the laws and diplomacy needed to navigate space will in turn inspire greater peace on Earth. I really have to ask, are you named after the great Captain Kirk?

KM: Unfortunately, I am not. But the irony does not escape me that we are sitting here talking about space. And I just so happen to be named Kirk. And if I have to be a little bit more truthful, I'm a bit more of a Jean Luc Picard kind of guy. You know, Kirk is a little too brash. I like Picard's more level-headed approach to things and he also likes Earl Grey tea. And so do I.

AP: Least we appear biased, let me throw out that Captain Janeway brought me into deep space.

KM: Well, it's time to wrap this up and end our great exploration into territories unseen, legal and non-legal. Any final thoughts you have on this episode and you know what you'll be looking for in the future?

AP: Yeah, I just can't wait to watch all of this unfold over my children's generation and to see where they take humanity.

KM: Big thanks to Amanda for your out-of-this-world reporting! At courthousenews.com, you can read the latest science stories covering space travel and exploration! As the space legal field continues to expand, we will be covering all the legal issues that arise. I'm looking forward to the establishment of the first intergalactic court myself! Be sure to follow us on Twitter @SidebarCNS and @CourthouseNews. In our next episode, we take a look into how debt collectors collect on default judgments from obstinate defendants. See you then!

[Outro music]