

## AirSpace Transcript Season 9 Episode 10: Movie Mini: Contact

**Emily:** Did you just call Green Bank a little experiment?

**Matt:** It was a modest experiment. He could only use these, you know...

**Emily:** *laughing* it's a huge telescope!

*AirSpace theme in then under*

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

**Emily:** And I'm Emily. Is there intelligent life elsewhere in the universe? And what would happen if their radio wave broadcasts were picked up by a scrappy astronomer who refused to take funding cuts for an answer?

**Matt:** *Contact* is what might happen. The book and movie of that name were written by real life scientists who are actually searching for signals sent out by extraterrestrials. It's a love letter to yearning for something bigger than yourself.

**Emily:** We're talking about *Contact* and walking you through some of the real life science as seen in the film, today on AirSpace.

*AirSpace theme up and out*

**Emily:** So the movie *Contact*<sup>1</sup> came out in 1997, but that's not where it started, right Matt?

**Matt:** Yeah, that's right. In fact, Carl Sagan<sup>2</sup> and Ann Druyan<sup>3</sup>, who, uh, the two of them later married, were working on this project even earlier than that. So 1985 is when it first comes into the world as a novel, and the movie is made in 1997<sup>4</sup>. But actually, you know, if we're thinking about where this whole idea comes from like the idea of searching for alien intelligence using radio signals kind of appears first in the 1960s in actually in the year 1960, when Frank Drake, uh, at the Green Bank Observatory<sup>5</sup> in Green Bank, West

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<sup>1</sup> <https://www.imdb.com/title/tt0118884/>

<sup>2</sup> <https://science.nasa.gov/people/carl-sagan/>

<sup>3</sup> <https://www.instagram.com/anndruyan/?hl=en>

<sup>4</sup> <https://www.vulture.com/2022/06/an-oral-history-of-contact-the-movie.html>

<sup>5</sup> <https://greenbankobservatory.org/>

Virginia, starts a little project trying to point a radio telescope at a couple of stars, seeing if he can detect anything that seems like an intelligent signal.

And then in 1984 that's when the SETI Institute<sup>6</sup> is founded in California as an actual non-profit research institute to organize all of the SETI efforts that have grown up since 1960.

**Emily:** And SETI stands for Search for Extraterrestrial Intelligence.

**Matt:** Right.

**Emily:** So we're gonna define intelligent life as a species or a series of species that can manipulate and control their own environments and create their own societies? Technologies? Ability to travel off planet?

**Matt:** For the sake of SETI, it's any society that has advanced technologically to the point where they are producing radio waves that can be transmitted beyond their planet.

**Emily:** But from a scientist's standpoint, we're talking usually there's kind of three levels, right? There's the microbial level, there's the complex life form, and then there's the what Matt just said.

**Matt:** Yeah, that's absolutely right, and I think, you know, one of the reasons why the SETI Institute was founded in the mid 1980s was to organize all of these projects that were going on sort of piecemeal around the country and the small amount of funding that NASA was providing for a few projects here and there, and to advocate for a larger SETI presence, SETI program that could, you know, grow in the way that it has in the last 40 years of SETI operating.

So it definitely has a prehistory of people like Frank Drake, Carl Sagan, Ann Druyan thinking about these problems and figuring out how to organize a research program around the search for intelligence. And then eventually it kind of solidifying into an institution with lines of funding that are dedicated to SETI research.

**Emily:** Well, and this is going to be the thing that I use to try and convince all y'all to let me do an episode on Frank Drake and the Drake Equation<sup>7</sup>, but most people don't want to talk about math, so we won't get into that part today.

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<sup>6</sup> <https://www.seti.org/history-seti-institute>

<sup>7</sup>

<https://science.nasa.gov/universe/exoplanets/are-we-alone-in-the-universe-revisiting-the-drake-equation/>

**Matt:** It's my favorite equation

**Emily:** It's your favorite equation. And Frank Drake is such a central figure in our changing understanding for whether or not we expect to find intelligent life somewhere in this universe. Right? And that's my perfect segue, Matt, into talking about the actual plot of the movie *Contact*.

*Contact*'s really interesting because Carl and Ann started putting this together as a movie script. They were shopping it around and weren't getting enough nibbles, so they published it as a novel<sup>8</sup>. Then they wrote a screenplay. But if you look at the credits, the screenplay for the movie *Contact* was not written by Carl and Ann. The movie used a different screenplay<sup>9</sup>. And he died in 1996, and the movie came out in 1997. And so while he and Ann are listed as co-producers on the film, it's also dedicated to Carl.

Anyways,

**Matt:** The movie.

**Emily:** Right. The movie. The central character, Dr. Ellie Arroway, is played by Jodie Foster, and is loosely based off a real scientist named Dr. Jill Tartar and the character of Dr. Arroway is a scientist who's really focused on listening for signals coming from outer space towards Earth that might be an indication of extraterrestrial life, and specifically intelligent life, which they sometimes throw around the word SETI, which we've been talking about already.

And we learn pretty early on in the film that, um, her interest in space, especially in radio signals in space, came from, um, her time as a child dabbling with HAM radio that, you know, she did with her dad.

And, um, she was kind of into it as a child because she thought maybe it was a way that she might be able to talk to her mother who had passed away, um, and then later her dad. And so she had this kind of connection between childhood misconception that, you know, heaven is up somewhere in space and that maybe if you understand these radio signals enough, you, you might be able to talk to people who have passed on.

Um but then she becomes this world famous astronomer who's incredibly accomplished and really devoted to trying to find extraterrestrial signals.

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<sup>8</sup> [https://en.wikipedia.org/wiki/Contact\\_\(novel\)](https://en.wikipedia.org/wiki/Contact_(novel))

<sup>9</sup> <https://sfy.ru/?script=contact>

**Matt:** Right. And so when we meet her, she's at the Arecibo observatory in Puerto Rico. And the villain of this story, David Drumlin, who's played by Tom Skerritt, comes in trying to cut the funding for her project and generally believing that SETI and the search for intelligence in space is a waste of the public's money. That sets up the tension of the movie.

**Emily:** Well, it sets up the tension of the movie and this is really an opportunity for the film to kind of show you the personality and the characteristic traits of Ellie Arroway in that she is going to find a way come hell or high water. And so she moves from Arecibo in Puerto Rico to the Very Large Array Telescope in Socorro, New Mexico, where she receives private funding.

She receives a big chunk of money from this very mysterious billionaire named S.R. Haddon, who's played by John Hurt. And I was having a conversation last night when we were watching the movie because I am that person. So sorry.

He gives off like 'Creepy Billionaire' vibes, but in such a, like, charming way that, like, you're not creeped out. Like he's a really interesting, looks like a villain, but isn't a villain, but is kind of a pot stirrer. I don't know. I really enjoy that character

**Matt:** Yeah. Well, I think of him as being sort of not necessarily immoral, but not necessarily moral, maybe somewhere in the middle, kind of a guy who's willing to do whatever he has to do in order to get what he wants. Right? So it's definitely interesting to see in something that was written in the eighties and then produced in the nineties, this idea of a mysterious billionaire who's really interested in space flight<sup>10</sup>.

We get to see that in real life today, but back then it wasn't so much a thing, so this along with a few other things. Sagan kind of saw what was coming, maybe.

**Emily:** Wow. I'm, my brain is now going to like be munching on that for like another week and a half.

But, Ellie Arroway gets the money from the rich guy named Haddon. And so she gets to buy telescope time at the VLA<sup>11</sup>. The Very Large Array Telescope is a series of radio dishes because radio astronomy is still astronomy. Those are also still telescopes. Um, we've talked about all different kinds of telescopes on the podcast.

And so she's using this array of telescopes in New Mexico to listen to signals coming from the sky. And she hears a signal coming from the Vega star system.

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<sup>10</sup> <https://www.cnbc.com/2016/09/23/8-iconic-billionaires-who-plan-to-conquer-outer-space.html>

<sup>11</sup> <https://public.nrao.edu/telescopes/vla/>

And they realize at first that they're not sure if it's going to be what they're looking for, right? Signs of intelligence. But they realize it's transmitting prime numbers from one to 101. And then they later realized that it's also broadcasting the opening speech from the 1936 Olympics<sup>12</sup>, which is the first telecast? Is that the right word, Matt?

**Matt:** It wasn't the first telecast, but it was perhaps like, I think it's presented as the first signal that would have been strong enough to actually go out beyond our, you know, magnetosphere or whatever and get to another planetary system.

**Emily:** Right. And then within this video signal, they realize the signal's kind of different and they realize it's different because sort of stuffed into that video signal is a bunch of essentially schematics for how to build a transporter. And we are skipping a lot of detail here, B-T-dubs

**Matt:** Well, one thing I want to point out is that one of the people that you see Ellie working with at the VLA when she's trying to make sense of this signal is a blind astronomer named Kent Clark. And he's actually based on an actual astronomer named Kent Cullers<sup>13</sup>, who was blind and worked at SETI. So that was one of these nods to the actual people who do the research.

They changed his last name, making him the opposite of Superman, I guess, as Kent Clark. But his actual name was Kent. It was Kent Cullers and he was a very talented radio astronomer.

**Emily:** When Ellie finds this signal the Vega system is about to set down past the horizon, so they can't observe anymore in New Mexico. So she calls a buddy in Australia, who's going to be able to pick up the Vega system coming up over the horizon to confirm that she's hearing what she thinks she's hearing.

And the movie pacing really ticks up really quickly at this point because now all of a sudden like you get the government involved and now everybody's all kind of getting involved in what does this all mean and what can we learn from it. And her project basically gets taken away from her. And I started having really big feelings as an academic about how, like, everybody's like, 'Oh, we're totally going to give you credit,' JK. As soon as the camera's on your face, like somebody else's like owning the project in their discovery.

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[https://stillmed.olympic.org/media/Document%20Library/Museum/Visit/TOM-Schools/Teaching-Resources/Broadcasting-the-Olympic-Games/FicheInfo\\_DiffusionJO\\_TV\\_ENG.pdf](https://stillmed.olympic.org/media/Document%20Library/Museum/Visit/TOM-Schools/Teaching-Resources/Broadcasting-the-Olympic-Games/FicheInfo_DiffusionJO_TV_ENG.pdf)

<sup>13</sup> <https://www.eyeway.org.in/?q=kent-cullers>

And this is where we go back to the villain that you mentioned, Matt, David Drumlin, because he's head of NSF, the National Science Foundation. But you find out that he's this like science advisor for the federal government, which is part of why he's so deeply involved in interpreting these results for the public and trying to make sure that people don't freak out completely.

**Matt:** Yeah, that's right. And this is where you see a real kind of about face from, uh, Drumlin, which is that he's been fighting so hard to stop Ellie from doing this research because it's a big waste of money and now suddenly he wants to be the face of this project and put all of America's, or the world's, resources toward figuring out what this signal means.

And it really is, you know, a grab, right? He's taking everything that she's been working on that he never believed in and making it his own for his own purposes.

**Emily:** Well, and he really doubles down because they take the plans that they got from the signal to build this transporter and then he puts his name in the hat for the person who's going to be in the transporter and essentially gets selected over Ellie because he's essentially finagled his way into this position by taking advantage of all the success that she's had and making it his own.

And I would say maybe the climax of the film is that as David Drumlin is getting ready to get into the transporter and is doing some of the tests in the transporter there's a terrorist attack that destroys the transporter that the entire world has devoted time and resources and energy into building.

But enter our favorite reclusive billionaire, S.R. Haddon who has essentially acquired the secret second transporter that was being built and Ellie gets selected, um, through favoritism at this point. I mean, obviously she was, she should have been selected the first time around.

She gets put in this little pod, um, and they hit the go button, right? And there's all kinds of dramatic scenes about do we abort or we not abort and what's happening.

And we see that Ellie goes on this, like, really wild trip and there's a whole separate conversation we can have about things like wormholes and relativity and whether or not any of that holds up scientifically in the film. But you see her go through what's essentially like an intergalactic metro system, um, and the tunnels are wormholes.

And that essentially allows her to travel through these sort of wrinkles in spacetime so that she can get to the Vega system very quickly. And then she has an experience with an

alien who takes the form of her father because the aliens think that will make things easier for her.

And, you know, in a way, it's a little anticlimactic because she gets to have this experience with aliens. But it's so short because they're like, this is just the beginning. Don't rush it. This is how we've been doing it for billions of years. And then she goes home. Her whole trip is 18 hours long. And nobody believes her because they're like, you were only gone for like, you didn't even go anywhere.

**Matt:** Right, because to people on the ground, all they saw was the capsule dropping and then landing into a safety net, and the only thing that's recorded on any of her recording devices is static. But what they don't tell the public, and what we learn from a private conversation, uh, in the Oval Office, is that it recorded *18 hours* of static not just the couple seconds witnesses saw.

So the people in charge, the people in power know that something happened, but they're telling the public that nothing happened. So there is this kind of acknowledgement that this was real and the people who need to know, know that it was real, but they're not going to tell anybody else.

**Emily:** Well, yes, but that all happens after there's this huge Congressional hearing and Ellie gets raked over the coals completely, and then you find out that the guy who raked her over the coals is one of the people who then finds out that she recorded 18 hours of time lapse. Nobody tells Ellie that, and nobody tells the public that, and then, like, Ellie just is supposedly going on with her life happily.

So I, you know, I think in terms of a satisfying ending, I don't know if the movie has that for me.

**Matt:** I don't think it's satisfying. No.

But I wanted to point out that this idea of a more intelligent species reaching out for first contact to Earth when they feel like Earth is ready is kind of this old idea. It goes back to, um, a 1953 novel by Arthur C. Clarke called *Childhood's End*<sup>14</sup>, which is about that first contact and the idea that Earth and humans are entering into that next phase where they're ready to leave the cradle.

Um, and then it's repeated again in *Star Trek* in sort of the idea that humans were brought into this Galactic Federation by more intelligent species who saw that they had developed

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<sup>14</sup> [https://www.goodreads.com/book/show/414999.Childhood\\_s\\_End](https://www.goodreads.com/book/show/414999.Childhood_s_End)

the appropriate technologies and had maybe turned the corner from their, their sort of more brutal warring ways.

So it's kind of this old trope in science-fiction that humanity will come to a point where the rest of the galaxy kind of invites us in to the intergalactic club.

**Emily:** Okay, so let's talk about some of the nerdy, like, Easter eggs that are in this movie, because I think some of those are really fun to talk about. And I think when you talk about the Carl Sagan/Ann Druyan connection, there's a lot of fun Easter eggs in here.

And I think the first is the similarity of the radio signal that Ellie receives at the VLA has very Voyager Golden Record<sup>15</sup> vibes and certainly that can't be a coincidence because the Golden Record was a project that Carl and Ann both worked on in terms of how do we represent humanity here on Earth in a way that if it was intercepted by some other kind of intelligent life that they would be able to interpret our message to them. The extraterrestrials in the Vega system are essentially flipping that, right? They have come up with a quote-unquote universal way to communicate with us.

**Matt:** Yeah, absolutely. And Frank Drake was also involved in the Pioneer plaque<sup>16</sup> that preceded the, uh, Voyager record.

But it is kind of this interesting idea here that, you know, we have this very curated Voyager record that's presenting humanity in a very deliberate way to whatever intelligent species might encounter it. And then we have this kind of haphazard radio wave television signal idea that what these waves are going to move a lot faster and travel a lot further than any spacecraft that we launch into space.

So they are going to be the first thing that an intelligent species might actually encounter if they know where to look for it. So the idea that we're just putting ourselves out there anyway, through all of the different radio signals that we produce as humans. And, yeah, it might be Hitler's speech at the 1936 Olympics that ends up being the thing that introduces us to the rest of the universe.

It's kind of, you know, this idea that we can't control how others see us. *laughs* I guess, kind of like you can have your curated Golden Record, but unless it gets to the right person at the right time, nobody's gonna ever know that this is how you want to be seen. Instead they're going to see all the junk that we put out on television.

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<sup>15</sup> <https://science.nasa.gov/mission/voyager/voyager-golden-record-overview/>

<sup>16</sup> <https://science.nasa.gov/resource/pioneer-plaque/>



**Emily:** So one of the things I love about the movie Contact is that it does make really good use of real life stuff, right?

Like, Arecibo is where we first start off in the movie and, um, Arecibo has always been a huge asset for radio astronomy. And we know that Arecibo collapsed in 2020. And if you want to hear more about how incredibly devastating that has been for the astronomy community and for the community around Arecibo in Puerto Rico, you should definitely go check out our AeroEspacial episode *From Puerto Rico with Love*<sup>17</sup>.

And Arecibo was being used in SETI kinds of research. The first time Arecibo was used in the search for extraterrestrial intelligence was in 1974<sup>18</sup> when they deliberately transmitted a message sent into space. Um, and it was a graphic that I can only describe as like early video games?

**Matt:** It does kind of look like an 8-bit video game.

**Emily:** Right. And it's a compilation of a stick figure, the Arecibo telescope, DNA, and a couple other pictures, um, to try and communicate, right? Going back to, how do you communicate with people who don't speak the same language, try and communicate where the signal was coming from and what we could communicate in 1974 through a radio signal.

**Matt:** Yeah, and then in addition to Arecibo as a really important hub for SETI research and for radio astronomy in general, that VLA, the Very Large Array in New Mexico, is still today a working radio telescope array that consists of 27 dishes.

And it's depicted pretty well, I think in, in the movie we don't get to see the Very Large Array very often depicted in movies. When I first saw this movie, I believe I saw it on the big screen, seeing all of those radio telescopes together, they're like these huge radio telescopes was pretty impressive to me.

So really like the big screen where I think I originally saw this movie is probably the best way to see the Very Large Array and really kind of take in its very largeness.

*Emily Laughs*

*Music Button*

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<sup>17</sup> <https://airandspace.si.edu/stories/editorial/aeroespacial-puerto-rico-love-desde-puerto-rico-con-amor>

<sup>18</sup> <https://www.seti.org/seti-institute/project/details/arecibo-message>

**Emily:** What do we know about the Vega<sup>19</sup> system, Matt? Is that a real thing?

**Matt:** Yeah, yeah, the Vega system is real. It is the brightest star in the northern constellation of Lyra, so it's not that hard to see on a clear night. And it's pretty close to us. It's only about 25 light years from the Sun. And it's one of the brightest stars in our neighborhood, if you will. The fifth brightest star in the night sky and the second brightest star in the northern celestial hemisphere.

So it's out there. It's, you know, one of those stars that you've probably seen and you might not have known it was Vega, but you may have seen it.

**Emily:** Well, and I, I kind of love this when we talk about movie minis, we're not always talking about newer movies. So what we know about Vega and the Vega system now is information we didn't have when the movie *Contact* came out and when Carl and Ann were working on this story.

So results released in 2013<sup>20</sup> using archived data from the Spitzer Space Telescope and the Herschel Space Observatory showed that the Vega system is similar to our Sun's in that it has kind of this warmer belt of rocky bits kind of floating around closer to the sun, and then that would be like our asteroid belt. And then it has this kind of outer belt of colder bits floating around further out from the sun, which it'll be a lot like our Kuiper Belt, which is actually really cool. And so it could be that there's some planets floating around in that inner belt of, kind of, the warmer rocky bits around Vega.

And data from 2021 show we think there might be at least one planet floating around in there<sup>21</sup>, but we haven't directly observed it yet, which is actually really interesting when you consider that we've observed all kinds of exoplanets around all kinds of other stars, um, in our neighborhood. And so I think there's going to be some really interesting stuff to come back from Vega in the future, except for maybe not necessarily signals from aliens.

*AirSpace theme in and under*

**Matt:** AirSpace is from the Smithsonian's National Air and Space Museum.

It's produced by Jennifer Weingart and mixed by Tarek Fouda. Production help by Erika Novak and Sofia Soto Sugar. Our social media manager is Amy Stamm.

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<sup>19</sup> <https://www.britannica.com/place/Vega-star>

<sup>20</sup> <https://www.nasa.gov/image-article/vega-two-belts-possibility-of-planets/>

<sup>21</sup> <https://www.colorado.edu/today/2021/03/08/giant-scorching-hot-planet-may-be-orbiting-star-vega>

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