TFH: E02: Connections: Examining Hawaii's Relationship with the Internet

SPEAKERS

Tony Vega, Brennon Morioka, Brandon Makaawaawa, Nicole Starosielski, Burt Lum

Tony Vega 00:01

Producer Tony Vega here and today we're starting things off in a parking lot at the University of Hawaii at Manoa. Hello, Dr. Morioka – This is Antonio Vega. I'm great. Yes, so I'm in, I think it's zone 13, I'm in the parking lot. So yes, Antonio is my actual full first name, but that is besides the point. The Dr. Morioka that you just heard me talking to on the phone is Dr. Brennon Morioka, the Dean of the College of Engineering at the University of Hawaii. And I went to the University to talk to him about something that you've probably never heard of. And yet, it's absolutely integral to the way that we live our lives today. In fact, I don't think I would have been able to make the phone call that you just heard me make without it. What I'm talking about is called ALOHAnet and it was developed at the University of Hawaii's College of Engineering in the late 60s and early 70s.

Brennon Morioka 01:05

It really was the birth of the way we live our modern lives. I mean, you know, yes, we rely on the internet, but even more so today, everything is mobile. So everything, for any kind of wireless communications, whether it's your cell phone, WiFi, everything has its roots based back in ALOHAnet.

Tony Vega 01:26

Developed by a team led by Dr. Norman Abramson and Franklin Kuo, ALOHAnet was created with the intention of using it to send data between islands here in Hawaii. Simply put ALOHAnet was a success, and it ended up being the first system ever to transmit data between computers using radio waves,

Brennon Morioka 01:45

What it really does is it helps to sift through and organize data, you know, through radio packets using radio waves. And a good example of this, and one of our faculty kind of shared this example, and it's, you know, it's very much for people like me, who aren't technically savvy with communications and wireless stuff, because I'm a different kind of engineer, but the example is, if you're sitting at a dinner party, with a lot of people, and everybody has a lot to say, and they want to start talking story, so

everybody starts talking all at once, but then, you know, human nature is you kind of stop, slow down, kind of let someone say something so everyone can listen, and then when they're done, then someone else now starts to talk, and if multiple people talk again, you slow down and you that one person talks. And then, so you start organizing a conversation,. and that's kind of human nature, right?! We try to organize the way that we communicate, otherwise we're just talking over each other. Well, data used to be sent that way, too. So when data got sent at the same time, and it hit each other, they would just get rejected. ALOHAnet protocols actually allowed it to be organized so that data could be sent, even if it's in, even if they're running into each other, it can be organized in a way or get scheduled so that the data will get sent. So if it gets bumped and it doesn't get sent, it knows that, and then it'll resend it again until that message is actually sent through.

Tony Vega 03:13
So the next time you make a phone call on your cell phone, make sure to say a little thank you to Dr. Norman Abramson, Franklin Kuo, and the team that worked on ALOHAnet, because without what they achieved, who knows where we would be, we'd probably still be making phone calls from landlines, I guess.

Brennon Morioka 03:28
ALOHA protocol is still used by all cell phones. So the first thing that is communicated when you turn your cell phone on that you send the message is that your cell phone says to the other cell phone, "Aloha!" So we really are continuing to spread ALOHA around the world. So it kind of gets back to one of those songs right "spread a little Aloha around the world." And it's really true. I mean, that's that's really what Norman, Frank did, is they continue to spread aloha because aloha is the first thing that that is said, when someone makes a phone call.

Tony Vega 04:03
On this episode of Transmissions from Hawaii, we are talking about Hawaii's relationship with the internet. So we started things off by talking about ALOHAnet, which helped usher in the age of wireless digital communications. But there is so much more to talk about than just that. For example, Hawaii is in the middle of the Pacific ocean, have you ever stopped to think about how it is that Hawaii is connected to the internet? Well, that's a really interesting topic and we're going to be talking about that plus a whole lot more. So let's get started. For the past couple of decades, getting access to the internet from your home hasn't been a challenge pretty much at all: you just call up your internet service provider, and pretty soon you're hooked up. But that's definitely not the case for everyone. Our first story is about a community on Oahu that didn't have direct access to the internet until November of 2019. So just for anybody that is not aware what the nation of Hawaii is, could you explain like what a little bit of background information?

Brandon Makaawaawa 05:08
Yeah, so the nation of Hawaii is the oldest Hawaiian sovereignty group in existence today. We advocate for total independence for the Hawaiian people because of the injustice of the illegal overthrow of the Hawaiian Kingdom in 1893. And subsequently, when the US apologized for that overthrow in 1993, and admitted to the crime, our head of state, Dennis "Bumpy" Kanahele helped create the Nation of Hawaii with his kupuna, and we've been carrying on this legacy ever since, to the point where we have gotten our own land base, which is the village of Puuhonua O Waimanalo, where we have created Hawaii's first community broadband network. At the pool we have varies between maybe 80 to about 90 people. It's a, it's a group of families now. It's a lot of women, children, men, people that have, that were there at our previous occupation of Mōkapu Beach. Back in 1993, when we leveraged the state with Apology Bill to get our land, so it basically just moved that occupation that was down at the beach for 15 months, and moved it up towards the mountains where we developed our own solutions for housing, food, clothes, shelter, water, everything.

Tony Vega 05:56
That's Brandon Makaawaawa, the Deputy Head of State of the Nation of Hawaii. The story of the Nation of Hawaii is a long and complex one and unfortunately, we don't have time on this episode to cover it in its entirety. However, what you should know is that they're based out of a 55 acre plot of land in the Waimanalo area of Oahu. They acquired that land in 1994 after a more than a year long occupation of Makapuu Beach Park. In exchange for vacating the park, they got a 55-year lease on an undeveloped parcel of land in Waimanalo, and that is where they established the village of Puuhonua O Waimanalo. About how many people live there at present? As for the internet, well, that's another area that they had to figure out for themselves. Brandon explains that for almost all of the village's history, they've had to resort to all kinds of ways in order to get online. Not surprisingly, doing things this way was not only complicated, it also wasn't all that cost effective. A lot of the times they ended up paying quite a bit more than what your average person pays per month.

Brandon Makaawaawa 07:47
There was a point in time where we had, you know, pretty cheap internet, it wasn't the best, but it was kind of cheap. But most everybody's household bill for internet was, was over $100 if you factor in satellite dish, you know. There wasn't one dedicated place where you got your internet, there was a combination of satellite, of mobile, of hotspots. And because these are families that live in these houses, so it's not just one person trying to get internet, you have the kids, yes, you know, you have other people trying to access the internet at the same time, so one solution wasn't good enough where we had to have multiple solutions. So multiple solutions mean multiple bills, which add up to you know, in the

hundreds a month per household, so I figure we have about 20 households up there that, you know, it was anywhere from maybe $2,000 to $3,000 total for internet for the whole village.

Tony Vega 08:49
So how was it that the nation of Hawaii managed to finally fix their internet problem?

Brandon Makaawaawa 08:54
Yeah, and well, in the very beginning was Burt Lum, who is the strategy, broadband strategy expert for the DBED, Department of Department of Business, [Economic] Development and Tourism in Hawaii. He was, you know, he's very instrumental in starting this whole thing. I believe he went to an Indigenous Connectivity Summit back in 2018 that was put on by a group called the Internet Society. And so he went there and it was being held in Inuvik, which is kind of near the North Pole, and, you know, he just was blown away that the Internet Society, their reach, you know, they were able to not only put on a conference, but they were able to actually do this workshop where they helped to create a broadband network for the indigenous community that was hosting them. And so Burt was, you know, talking with Mark Buell, from the Internet Society, and some of the other folks there that, you know, he'd like to host next year's conference. So that will ended up being the 2019 conference, and so Mark Buell and the Internet Society folks really wanted to do, you know, the same thing that they did for every Indigenous Connectivity Summit was find an indigenous community, that is, that is hosting the conference and find the community that they can help create a community network. So it was mainly Burt, you know, working with Mark. And then, and then on Burt's end, and he had to find a community. And so, you know, there's a lot of red tape that goes along with trying to find an indigenous community to work with, because if you're going to work with Hawaiians, we're spread out all over the place, you know, there isn't a community that just has Hawaiians in it, we can just go to, we're different than, than other places that have federal recognition, where you have, you know, a reservation, we don't have one. But we have stuff like Hawaiian homes, which, which is also something that, you know, that he tried to look at, you know, to find a community through there. It was kind of, you know, it's it's a lot of red tape there. So he reached out to one of his friends Colin Kippen, and asked if, you know, what about Bumpy's, you know, land, he got land, he got community, you think you would be interested? Then because Colin knew Uncle Bumpy, our Head of State of our nation. He has a "Yeah, let me give him a call." So we set up a meeting, we talked story with Burt, you know, we liked the idea because we have internet issues and we liked the idea that somebody's going to help us bring internet to our village. Burt started the whole process and, and we brought in the Internet Society, we had a good meeting. And then we went forward in a partnership between us, the Nation of Hawaii, Burt, the State of Hawaii, Mark Buell from the Internet Society, and then we looked at HawaiianTel to deliver the backhaul to us, which, which was a huge portion because, you know, without the backhaul, without the fiber getting to us, there, you know, there's big costs in it. So we needed the help with Hawaii until to be involved that finally,

HawaiianTel you know, I think it was just a matter of time till they got involved with us. When we bought the right people to the table. Burt was a big help because he's he's with the State to kind of gave us some legitimacy, and then you see something like the Internet Society, hosting their, you know, global conference here in Hawaii, HawaiianTel wanted to be a part of it. So, you know, it was an incentive and everybody made out in the end.

Tony Vega 12:38
Hmm. So in terms of like, from the, like, construction kind of perspective, what was that Hawaiian Telecom that they, they helped, like, I guess you need like some kind of hub and then from there you run cable to each, like house? Is that how it works? How does that go?

Brandon Makaawaawa 12:54
So, so what happened was, um, you know, the, when, when Uncle met with Burt and Uncle met with HawaiianTel, Internet Society, we needed to kind of educate them on on what our lands actually is, and how we do things on our lands where, you know, we are the ones responsible for putting in anything, you know, no, we don't rely on the state, we don't rely on anybody else. So it had to be like a, like a partnership. So what happened was, HawaiianTel agreed to run the fiber to one of our telephone poles in the outside of our property. And then we agreed on our end that we would trench the rest in. And so they provided the fiber, the conduit that it went in, and we provided the manpower and the machines to actually dig the trench, and actually trench, the conduit up to our central hub where we had it maybe about 600 feet uphill or away from the road. So we had to trench about 600 feet to, to our central meeting area which was our pavilion, where we housed, you know, everything the fiber, where it came in, you know, the routers, and all the equipment that would run the internet service. And so from that hub, what, what happens is it, it's almost like a radio tower, but um, it's, it's a high, you know, something that's built for the internet, so it's, it's, it can carry like fiber-optic type speeds over it, and it can broadcast it directly to a house. So what happened was when we set up that that hub, we knew that you know, from from that central hub, we would have to place what they call CPE units, which is basically an antenna on each house to actually receive the signal from the central hub and we couldn't, you know, manage it that way. So once it came in physically, we've dug the trench and put everything in physically, everything else is wireless. And so it's wireless from the central hub out to the different houses because we're not all like, you know, it's not flat ground, it's not all on the same street, we're on a hill, and there's trees in between and dizzy and all kinds of stuff, geographical things that we have to like kind of maneuver around. And we're still working on that today, we still have issues because of, you know, somebody's, the positioning of people's CPEs and antennas and stuff, so that's something that we're slowly kind of working out.

Tony Vega 15:27

Wow. So from the point where Hawaiian Telecom did their thing, they connected to the telephone pole on the outside of the property, to the point where people were getting access at their house, like about how long was that process?

Brandon Makaawaawa 15:42
To lay the fiber else that was, we did that in one day with HawaiianTel, yeah, we did that in one day. Because you know, our people we experienced with doing our own utilities, we run our water lines, we do our own electrics, so whether they want it to go up on the poles or in the ground, our people are prepared for that, it's just a matter of resources, sure, to help us so that, you know, things things are taken care of by the Internet Society, so we didn't have to put in any additional costs. So we donated our time, and you know, we put our people's time into doing that, so you know, that was our contribution to the project. And so doing the Indigenous Connectivity Summit piece of that, where the Internet Society came and had the conference in Hale'ōlelo for two days, and then two days had the conference, continued the conference at our village where we actually built a system together with experts from the Internet Society that took two days so total maybe three days.

Tony Vega 16:47
Wow. So in terms of like, a practical cost, like, I guess, cost has gone down, like as we were talking about before, where it was very expensive, now is internet access much more financially accessible for the average person living there in the community?

Brandon Makaawaawa 17:05
Yeah, yeah, a lot, it's, it's gone down a lot, because we're able to, you know, kind of centralize it to just pay in HawaiianTel one, one customer - one bill. Now we have costs that we have to take off, which is to pay that bill. Yeah. So instead of everybody paying individually, anywhere from $100 to $200 a month, now they pay us a lesser fee, a lot lesser fee for us to pay HawaiianTel. And because we you know, creating a community network, you have to actually kind of like almost create your own internet company. So we are our own what they call ISP, Internet Service Provider. And so right now we're kind of managing it, you know, voluntarily and stuff, but eventually what we want to do is create it to where it's a job for actually somebody in the village. So instead of us paying HawaiianTel, instead of us, you know, paying DirecTV or AT&T individually, and having that money go somewhere else, you pay our internet company, which is inside the village, and, and it provides a job for somebody that lives there.

Tony Vega 18:22
Right.

Brandon Makaawaawa 18:23

You know, and so it's, it's.. cost has gone down a lot, but what we trying to do, too, is trying to show people that, you know, when, when you eliminate a lot of this, this, this overhead of trying to create profit, and trying to, trying to do all these things, when you get down to it, trying to provide internet service, equitable internet service at cheap rates, it can be done. And so we're just going to kind of blaze ahead and show how that can be done in reality.

Tony Vega 18:57
For more information on the Nation of Hawaii, visit their website at Hawaii-nation.org. And to find out more about the Internet Society, you can find them at internetsociety.org. Next up, we're going to the bottom of the ocean. Kind of, you, you'll see. But first, a quick break. Transmissions from Hawaii is supported in part by Hawaii SHIP. Hawaii SHIP is a federally funded volunteer based program administered by the Hawaii Department of Health Executive Office on Aging. Their Medicare-certified counselors provide free unbiased local counseling to beneficiaries, their loved ones, caregivers and soon-to-be retirees. They also offer free virtual presentations on Medicare related topics. For more information about requesting these free services, or joining their team of volunteers, visit their website at hawaiiship.org, that's hawaiiship.org. You can also find a link in our show notes. Most of us never stopped to think about it but Hawaii is in the middle of the ocean, so how is it that we're able to send and receive data here in Hawaii? Well, that's all thanks to a vast array of undersea cables that are constantly transmitting data across the bottom of the Pacific Ocean. I tracked down an expert on the subject.

Nicole Starosielski 20:27
My name is Nicole Starosielski and I am Associate Professor in the Department of Media Culture and Communication at New York University.

Tony Vega 20:35
Dr. Starosielski is also the author of "The Undersea Network", a book that explores everything from the history to the socio-cultural and environmental impact of these undersea cables.

Nicole Starosielski 20:46
The whole story of how I started my research really began in Hawaii, like

Tony Vega 20:51
Really?!

Nicole Starosielski 20:52

I did not know very much about undersea cables, I was tracing them on a map, I was just sort of trying to figure out like, what are these infrastructures that carry all of the internet across the ocean. And I noticed, when I was looking at these maps, that Hawaii was one of the central hubs of the Pacific. And so I got a research grant, which was really awesome, and, you know, I was able to travel to Hawaii, and I thought, well, what I'll do is I'll go to the places where these cable stations are. And the cable stations are the, the infrastructures, they're the buildings where when undersea cables that carry all the internet traffic come ashore, they connect to other cables in these cable stations. So I thought I would, I would go to the places where the cables land. And I didn't really know very much at that point, I didn't know anybody who worked in a cable station, I didn't really know anybody in the industry, who, many of whom I would later meet. But I was just a graduate student and so I was kind of just wandering around. I eventually got in touch with some of the people who worked at the cable stations, but not when I first visited. There was, you know, driving up and down Farrington Highway, I was able to identify where the stations were, they're trying to get a sense of, well, why were these stations put here? what was the connection or just connection between the stations and people who lived in this area? And, and so I was, you know, hanging out on a beach, like taking pictures of the cable stations and the beach and trying to sort it out, and I met this guy, and I called him John in, in the book, and he very generously like offered to show me around, and just kind of take me around and tell me, you know what the area was like, and to kind of just sort of inform me. In exchange, I was telling him about the undersea cables and telling him about you know, that they come up in these manholes, and then they connect to the stations and they connect to other cables all across the Pacific, and they connect to Tahiti and Japan and California and Oregon and Fiji and New Zealand and Australia, and all of these, this, this internet traffic that's connecting all over the world, it's actually being funneled right beneath our feet. And so I was trying to explain that to him and he was trying to explain to me, you know, what life was like, you know, along Farrington Highway, and, you know, for a few days he showed me around, and, and so I started to understand a little bit more about, well, what, what these cables were caught up in, and both like why they had been laid there, because the military presence there, like that was deemed a more sort of secure area, you know, it's because of sort of military had territorialized the area in advance sort of cleared the way for the cable network. But also then why had actually become such a contentious area to land, and actually it's becoming quite difficult for the cable system to extend to and through Farrington Highway, because of all the kind of problems that had been caused by the very things that had made it possible for it, for those cables to be landed there.

Tony Vega 24:11
Mm hmm. So there's multiple landing sites along the highway, is that is that the case?

Nicole Starosielski 24:19

Yes, that is true. So they're, they're multiple landing sites, three landing sites along the highway. And, and they come in, you know, they're the, the one site was developed, two of the sites were sort of Cold War era site, and stations were kind of Cold War era stations, and one of them was built for the compact cable, which was the Commonwealth Pacific cable, and that was basically to connect Canada, Australia, Fiji and Hawaii was one one stop on that Commonwealth cable. And then the United States connected to Hawaii, and then went west from there on the Trans-Pacific cable network. And so that's actually a really unique set of network landings because you've got this sort of, almost like North-South cable system that's built on the back of the British system, British telegraph system, and then you've got this East-West cable system, you know, from the United States to to East Asia, that's built on the back of their colonial cable system. And both of these cables landed in the Cold War era along Farrington Highway and today, internet traffic still traverses the same paths.

Tony Vega 25:40
Hmm. Oh, in the book you mentioned and you kind of mentioned it just right now, but there's some times here in Hawaiian and in some other places, there has been resistance towards the, I guess, the construction or the implementation of these cables and stations. What was the case, for example, they're at Farrington, in the Farrington Highway area, west Oʻahu, what, what was it that the locals were resistant about?

Nicole Starosielski 26:08
Well, I think that there's, there tends to be resistance to cable systems when the people who are running the cable systems are installing the cable systems aren't necessarily in touch with or connecting to the local communities. Because then it just kind of can look like another, you know, major infrastructure and, and people might wonder is this like, this an oil pipeline, or what's basically being laid, right?! You don't know, right?! It's just looks like, you know, is this a warehouse? Is this a military installation? Not many people know about undersea cables, and even if you talk about undersea cables, it's kind of baffling, right?! Like, you're like, oh, all the internet. It travels on the bottom of the ocean floor through these cables that are like the size of a garden hose, all of it, all of the internet.

Tony Vega 27:01
But what about satellites? I mean, I think that's really like answer to that.

Nicole Starosielski 27:05
Less than 1%. The Internet does not travel through satellites for most of the world. So, so I think that when cable systems are being set up, if there's not enough knowledge about what the systems are, it's very easy to sort of misperceive them as something that's going to be a lot more sort of either ecologically detrimental, socially detrimental or harmful or threatening if you don't know. And then on

top of that, you know, none of this traffic was being funneled off into the hands or networks or cell phones of people who were, you know, living along Farrington Highway, right? Like, I mean, eventually it does, right. So like, if you do get a little bit of trickle down, where it's like, okay, there is huge cable systems and they're traveling across the Pacific, and they're bringing with it all of, you know, people in Los Angeles, talking to people in Tokyo, right, or traveling under these beaches. But it's not so simple to say, like, someone who lives on or next to that beach, that they could just tap into that - it's like a major freeway, and living like underneath a major freeway without an on ramp or a car. And so how, how then, do you even feel like you're connected to this infrastructure, you don't necessarily, if it's run through your community, you don't necessarily think, well, this is benefiting me, or this is something I should identify with or care about. So there can be a lot of resistance in those instances. I think the case there's a case in Tahiti, where there was a celebration of the cable system landing, and there was a monument put up right in the school, and I think that also came along with a lot of publicity about the cable and the people who laid the cable, you know, came up with a, you know, a logo and a graphic and told the story about the cable system connecting not to an ancient sort of, you know, colonial network, but rather to the movement of islanders across and between different islands and the ways that the ocean, you know, permitted that movement, and today the ocean permits the movement of the internet. And since there was a different kind of narrative that was spread about the cable, the cable was not laid along a path of old telegraph network, it was not laid in the same kind of configuration, say, in Farrington Highway where did cable stations are laid up, up in the mountains that have been territorialized you know, by the United States. In Tahiti, the story is a little bit different two people thought saw the cable as like connection that was going to enable you know, internet connection to the world, they saw it, or this was the kind of narrative that was spread. And so it's easy to sort of cast that system and portray that system as a point of pride and to have people who could then identify that system as an important connection for them. Whether or not they actually ended up using it, sort of speed, besides the point, they saw it as something that could benefit them.

Tony Vega 30:29
Yeah, yeah, yeah. So in the book, you described several, you know, landing spots, cable stations, like across the Pacific, not just on Hawaii, but for example, in Hawaii, you you touch on, you know, the Farrington Highway area, but you also describe a couple other ones. Could you give us an idea of just kind of how these places differ, like, you know, there, are they just like little shacks in the middle of nowhere or are they more like complex kind of buildings? Like what kind of places are these where the cables are coming on land?

Nicole Starosielski 31:00
Well some of them, so the Cold War era cable stations, and this would include, for example, there's a cable that comes in at Hanauma Bay, and that station is buried underground, and it was sort of part of

a, like many stations, and there's another one on Farrington Highway, that's, that's underground and it's built in this kind of bunker-like mentality, right?! There, there's really thick walls, and it's kind of disguised, it's hidden. And so these cable stations have been in use for a long time. And actually, the Hanauma Bay cable station, the, the in order to get through, the cable laid through Hanauma Bay, they had to blast through the reef, and that, that is now called the Telephone Cable Channel. And it's actually if you go out, Hanauma Bay, you'll see there's this kind of channel through the center, and that was actually produced through this dynamite blast.

Tony Vega 31:59
Wow, I didn't know that.

Nicole Starosielski 32:00
Yeah, so if anybody is out swimming there or snorkeling there, you will be able to see that, that, that channel was actually created, and I have pictures of it, of the blast that they created in order to get through the reef, to get the cable up through the reef. Right. There's another cable station on Farrington Highway, that is the one that I mentioned for the Commonwealth Pacific Cable, and this actually has like a really interesting story. to it. It's the, it was built like in the 1960s, I believe, it's I think it's 1962. And they the cable station was built as this sort of like kind of classic Cold War era station. But what happened is they ended up developing a kind of new kind of design for the cable station in the 1980s, and it was actually designed by a local Honolulu-based firm. And it was inspired by it like basically the CEO of Teleglobe Canada visited the station. And there was very little space, it was not a very, like staff friendly environment, there's not much space for gathering inside. And so basically, most of the staff members at the station had to, like hold their meeting in this small cramped lunch room. And afterwards, the CEO saw that the station workers were like outside, joking around and kind of like hanging out, and he was sort of inspired by this community. And so they built this new stuff friendly environment, and it was sort of read the redesigned station is beautiful. I mean, they have, you know, it's got this, this view, and it's got a lot of it's got this kind of glass facade. And so there's, it's a different kind of mentality of station construction, it was meant for, like when you walk up to it, like it's, it's welcoming, it's not a bunker. And so that's just a kind of, you know, there are minor differences between these different kinds of stations that reflect their histories that reflects the culture of the community inside the station. And sometimes as in the case of this one, actually, you know, connect to the Hawaiian environment and connect to local architecture firms.

Tony Vega 34:23
Mm hmm. Generally, though, the, the approach seems to be like to stay out of sight, to not stick out, to basically not let people know that this is a potentially very important sort of infrastructural location, right?

Nicole Starosielski 34:38
Absolutely. You would not want anyone to know where your cable stations are. The, the general mentality of "security through obscurity," so you don't want anybody trying to interfere with your digital networks. And I think this is true, pretty much across you know, internet infrastructure. It's not usually something that, you know, is, is broadcast or marked, or highlighted, in the same way that, you know, some infrastructures, like bridges are super visible, and when they're constructed, they're supposed to be visible. And cable stations not so much. So, and part of that is security, and part of that is that, you know, there have been, they haven't historically been, you know, a site of like, you know, celebration, at least not since their, their origins. The early telegraph stations were often supposed to be very visible, and they were, you know, people knew where they were, and they had the name on them. And so, you know, that, that was, you know, when these cables were new, and when they were the, you know, infrastructure for global communications, it was telegraph cables, undersea telegraph cables. Well, then you get radio, and then you get, you know, a couple of world wars, you get the Cold War, and really, these infrastructures become much more set of security and something that you, you don't necessarily want to publicize.

Tony Vega 36:09
Yeah. Let's say you were to talk to the average person who does not, you know, think about these things, is there anything that you would like them to understand? Do you, have you seen any kind of popular misconception, or something that people are just unaware of, in regards to these cables? Is there anything that, for example, the listeners here in Hawaii, that you would think that they might, you know, it might be good for them to just know or understand?

Nicole Starosielski 36:36
Well, I think that the most important thing to know about undersea cables, aside from the fact that they carry almost all of the internet across the oceans, and that it does not go by satellite, is that that's also the future. Almost always I will give a talk about undersea cables, or talk on a podcast about undersea cables, and then at the end of the podcast, someone asks, well, isn't it all going to satellites soon? or won't this be replaced by satellites? The answer is no. Even though there are new satellite networks being launched, those aren't going to replace undersea cables - undersea cables are going to be around for a long time, and, and this is for several reasons. If you think about just sort of kind of basic, without getting into technical details, if you have a cable system that traverses the earth surface, that's less distance, right?! So it's much less distance than going all the way up into the atmosphere, into space, and then back down again. There's no interference, right, you are sending signals down a strand of glass at the speed of light, so it's direct. And these cables, they go down under the ocean, and they last for decades, and they work for decades. A lot of them actually hit a point of economic obsolescence before

they actually stopped functioning. And so that, so I think this is just to say, like our cable system is already in place, it's carrying, like almost all of the transoceanic data, and it's going to continue to work that way. The second thing that I would say is a popular misconception about cable networks is that people often think that they're sort of, you know, they float in the ocean, or they're strung between mountains, and actually, what happens is that they are actually laid very precisely on the, the very kind of topography of the sea floor. So they go all the way down, like, deep into the trenches amongst all of those kind of weird sea creatures that live at the bottom of the ocean floor. So amidst like, if you just think about that, all of the internet traffic, actually our conversation right now, I'm

Tony Vega 38:59
Yeah!

Nicole Starosielski 38:59
I am talking to you from New York, and our, and our like, conversation is being transported, that my voice is going into little signals that are, that are actually on the sea floor right now as I speak them to you and I hear your voice. And our voices are both actually amongst this creatures on the sea floor, and the sediment, like that's actually where we are, right now. So I think that that's hard to grasp, it's, it's actually the sea floor. And they're actually really, really secure down there, because you lay cables across the continent, and you got people with like, back hoes like accidentally digging them up, and like, you know, all sorts of problems happen when you lay a cable, I mean, you see this probably just locally all the time, like..

Tony Vega 39:53
Yeah, I hear about all the time!

Nicole Starosielski 39:55
But you put something on the sea floor and it's pretty safe. I mean, people just can't get to it. And so I think that, so that people think the ocean is really dangerous, but it's not dangerous for undersea cables, it protects them.

Tony Vega 40:10
To learn more about the fascinating world of undersea cables, you can pick up a copy of Dr. Starosielski's book "The Undersea Network." You can find a link in the show notes in your podcast app, or at transmissionsfromhawaii.com. We'll be right back after this. Hello, producer Tony Vega here, and I just want to take a quick moment to say thank you to all of our listeners. Thank you so much for all the positive feedback and reviews that we got from episode 1, it was an absolute delight to see that people were enjoying the show. We hope you're enjoying this episode, and of course, we are working on more,

so make sure to subscribe so that you don't miss them when they come out. We are doing our absolute best to get you one episode every month, but these episodes do take quite a bit of time to produce, so sometimes it may be a little bit longer than that. But if you subscribe, then you won't miss any episodes when they come out. Again, thank you so, so much for all your support and for subscribing to the show, and with that, let's get back into the show. If you were paying attention earlier in the show, then you may remember the name Burt Lum.

Brandon Makaawaawa 41:27
Well, in the very beginning was Burt Lum.

Tony Vega 41:31
He played an instrumental role in helping the nation of Hawaii get internet access at Puuhonua O Waimanalo.

Burt Lum 41:38
I'll just say my name is Burt Lum and I'm the, the Strategy Officer for Broadband in the State of Hawaii. My, my office is in the Department of Business Economic Development and Tourism.

Tony Vega 41:51
However, a lot has happened since the end of 2019, and Burt has been very busy with other projects, including one called the Broadband Hui.

Burt Lum 42:00
When, when COVID-19 really hit Hawaii hard, and everybody was pretty much, because of the executive orders, you know, to stay at home, so everybody was working, as well as, as educating from home. And, and what, what became very, very obvious was that there were a lot of people that weren't connected and that became, that became kind of a rallying cry. So over the course of, since March, we've been convening something called the Broadband Hui, and the Broadband Hui is community stakeholders that wants to help, in various ways to help, close that digital divide. And so we were able to bring together, we started off with maybe, you know, 20, 20 people, which consisted of the carriers, you know, like the, the Hawaiian telecoms and the spectrums, and it grew to now, which is, we have a mailing list of more than 200 people that represent a combination of private sector, which you know, includes the carriers, the wireline carriers, the wireless carriers, nonprofits, various industry experts in areas like telehealth, we, we've got the Department of Education, you know, the University of Hawaii, private schools involved. And so, so the, the Hui has been an ongoing, a discussion about how do we help to address you know, the disparity, that, that really was brought to the attention of everybody as a result of the pandemic.

Tony Vega 43:48
Hmm. So, since starting that, have you seen, you know, like some changes, or what, what is going on to help people get access to the internet? Has there been any sort of, you know, specific thing that you can point to?

Burt Lum 44:08
Yeah, so, so what has happened is that, we bring people together, and, and the, the big thing about bringing people together is that they bring a variety of different resources with them. So, one of the things that, that and it's not like, you know, I do all the work, it's, it's a, it's a collective effort and a collaborative effort. So, I give you an example: so the, you know, the Department of Education was able to get some monies to deploy laptops as well as mobile hotspots. So that was a big effort to get students connected. There's another group, a nonprofit called Hawaiian Hope, and they were very much involved with refurbishing of hardware, so this is a way of getting families and students as well as Kupuna, who perhaps didn't have a computer to get a computer for free, because these were, these were donations that were made to Hawaiian Hope, and they were from legitimate, very legitimate businesses like banks, that would give them the hardware and they would then, you know, refurbish it and then get it out to you know, needy families. And, and so there were, there was, there is still going on, an ongoing effort to deploy your hardware solutions. Another one is something called "Wifi on Wheels," and so one of the nonprofits, the folks over at the HawaiiKidsCAN, they had seen an opportunity to perhaps use buses that weren't currently being used and, and equipped them with WiFi access points. So that was a partnership between Kuwaitis can and, and the wireless companies that, that equipped the bus with something that could communicate to the wireless towers, and then from the bus, they could deliver WiFi to students that could, could, you know, congregate around, you know, this, this "WiFi on Wheels" bus, so that's another another example. Yeah, a fourth example would be like, we were able to get some Cares' money for a telehealth project, and the telehealth project was with a nonprofit called Hope Services. And they had already been doing services for homeless communities on the Big Island, but what the telehealth piece enabled them to do was actually take iPads and mobile hotspots so that they could be equipped, you know, to communicate directly in, you know, the information that they could gather on the field, into their, their online system. So, so it was, it was a way to improve their, their interaction and data gathering, so rather than do it on hardcopy, they could do it, they could do it via the iPad. And then the fifth one that I'll just quickly mention is that, you know, the the model that we helped to develop up at Puuhonua O Waianae or Waimanalo, is now being extended into other rural communities Puuohonua O Waianae is is one, we're looking at also doing one in Molokai as well as Kipahulu, so those are examples of community networks that could leverage connectivity, but then also help to distribute that connectivity via wireless solutions, using things like WiFi nesh, and other technologies. So those are some examples of, you know, projects that kind of came

out of us gathering together, you know, in the, in the Hui, no one person could do it, by themselves and, and together with, you know, with other stakeholders, you know, we could bring the right sort of resources to the table.

Tony Vega 48:26
One other aspect of what Burt does involves preparing for the future. It's obvious that the internet isn't going anywhere, and demands on bandwidth are only going to keep on growing. So Burt is working on various projects that help ensure Hawaii's connection to the internet remains fast and reliable. For example, since 2017, he's been trying to secure funding in order to construct a carrier neutral cable landing site, and recently, he's also been working with state senator Glenn Wakai, who has been talking about turning Hawaii into a prominent place for eSports. In case you weren't aware, eSports is basically competitive video gaming, and it's a billion dollar a year industry that continues to grow year after year. So capitalizing on this could mean new money coming into Hawaii, but again, it all comes down to whether the necessary infrastructure is in place.

Burt Lum 49:19
Yeah, so the whole premise behind cable landing was that it would help to lower the barrier for trans Pacific fiber projects to consider landing in Hawaii. And what's happening now, if you look at, if you go to websites like telegeography or submarine fiber maps that show the, the entire world and where the fiber lines run, a lot of the Trans Pacific fiber projects are bypassing Hawaii. So that's a major concern because there was a time when they would land in Hawaii for technical reasons, but because of the technology, there's no known necessity to land in Hawaii. If you can think of it similarly, like, airlines: airlines are at a, at a point now where from a technology standpoint, and from a fuelling standpoint, they can fly right across the entire ocean.

Tony Vega 50:24
Yeah.

Burt Lum 50:25
So, so part of the, the challenge was how do we, how do we identify a project that would help to lower the barrier and, and, and when I talk about barriers, like when, when a private company comes in to consider Hawaii, they would, they would need to spend probably a couple of years going through the permitting process, the land acquisition, the, you know, the surveys, and all the pre-work, not to mention the actual building of the what, what I refer to as sort of "the undersea conduit" that would get to, get to land. And all of that work takes time and money. So if we were to build that, then, then it would be much quicker for those projects to actually land here. And so that was, that was the premise behind doing the cable landing infrastructure. And, and what that does, what that does for Hawaii is that it, it

provides more opportunity for trans-Pacific fiber to consider landing in Hawaii. So right now we're sort of at this hub, right?! We have a few cables from Asia, a lot of them are actually going into Guam, and then from Guam, it comes to Hawaii. And then we also have fiber from Australia and New Zealand, and then it goes from, you know, Hawaii to the west coast. And these are all private sector companies. And some of the more recent projects include something called SCUS, and that's SEA Southeast Asia CUS, and another one called Hawaiki. So those are a couple of recent projects. And, and by building a, you know, an additional cable landing, that's, that's funded by the private sector, what we would have done is, instead of doing just one bore, and what I refer to a bore, think of it as a conduit. So, so a private sector company who are coming in to land their cable, they would just build one bore, because that's, you know, what they're bringing in. But if you were to build it so that you could accommodate multiple projects, then you would do multiple bores. And so the project entailed doing multiple bores coming into a landing site, and our initial landing site was in Kakaako. So that's what the plan was, that's the, that's what we've been working on for the last couple, you know, three years. We're still seeking funding, so, you know, it's not, it's not an obvious, you know, project that's, that's funded, and we're moving forward, we're still, you know, working on that part of it. But to to answer your question about Senator Wakai and some of the ideas and vision that he has about establishing Hawaii as a as the epicenter for, you know, things like eSports, in order for any of those types of projects, whether it be eSports, or, or even things like doing autonomous vehicles, or doing AI machine learning, or doing any kind of, let's say, VR, AR, or even even things like smart cities, types of applications, you're going to need a robust broadband network. And when I say robust, it's not only on, on Island, but you also need to connect the neighbor islands, because, you know, this, this can't be done just for a walk, right, you want to you want to be able to share this infrastructure and this technology across the entire state, right. Because one of the, you know, obviously everybody listening to your podcast is going to already know that Hawaii is in the middle of Pacific. And, and if you think about so, you know, where is it that we get all of this information, and applications and, and games, and stuff we've learned, you know, streaming media stuff, we've become accustomed to, the stuff doesn't come from the air, you know, it comes from these fiber optic connections. And, and if Hawaii isn't situated to take advantage, or at least show the rest of the world that we have the capacity and the infrastructure to be, you know, very, not, not very, we need to be advanced in that arena, we can't be trying to catch up. And that, that goes to what what Senator Wakai was talking about in terms of, of latency, if, if we can convince some of the, you know, the cloud platform folks to locate some of their servers and their applications into Hawaii, then we can, in essence, solve the latency problem, because all you're really doing is going from, you know, going from your application device to the server. The other, the other thing is, as you as you grow the demand for, for data, and and all these applications are going to, going to drive that use of data, you want to be able to connect to the global network, and how do you connect to the global network? It's the trand-Pacific fiber cables.

Tony Vega 56:00
One last question I just thought of, but and I don't know how much you can say directly to this question, but are you optimistic about the future of Hawaii's internet connectivity, both within the state and to the outside world? How are you feeling about things at this moment?

Burt Lum 56:20
I'm feeling pretty optimistic. I mean, I think on a national level, there is a, not only renewed, but a heightened interest in an area called digital equity. And, and in terms of digital equity, how do you, how do you get people to not only have access, but literacy to take advantage of these technologies. And I think there's a, there's a pretty unanimous recognition that, that the entire United States needs to be very active not only as a participant, but a contributor to the digital economy. And, and more so in Hawaii, because I think there's a recognition that, you know, if we're going to diversify our economy, it's going to be in this area of the digital economy. And I think, I'm very optimistic that there's, there's interest across the entire community, from, from, you know, the individuals that take part in the Hui, but also participate, participants also include, you know, legislators, as well as our congressional team. So there's, there's uniform, you know, support. The question is, you know, at the end of the day, you need resources, right, you need money. And, and I know, I know, from a state standpoint, you know, it's going to be hard to get funds to fund some of this, but I'm optimistic that we can, we can probably get funds from federal programs, as well as the philanthropic community has really stepped it up as well to recognize that some of these projects need some funding and, and, you know, they, they have been active, active as participants to, to see where they can help lend some of their funding resource.

Tony Vega 58:19
If you'd like to hear more from Burt Lum, you're in luck, because he hosts his own radio show and podcast. It's called Bytemarks Cafe that's bytemarkscafe. it airs on Hawaii public radio, and you can also find it wherever you get your podcasts. Links will be in the show notes, which you can find in your podcast app, or at transmissionsfromhawaii.com

Kuana Torres Kahele 58:40
[music, performing Kaneohe]

Tony Vega 58:54
Transmissions from Hawaii is a production of wasabi magazine. It's produced by me, Tony Vega in the beautiful city of Honolulu, Hawaii. If you enjoy the show, then please remember to subscribe, so you don't miss any future episodes, leave a review on your favorite podcast app, and of course, tell a friend or family members so that we can turn this into something sustainable over the long term. We need to grow the audience in order to do that and that's where you come in. So if you enjoy the show, and you

want more episodes, then please help us spread the word. The song you're listening to right now is called Kaneohe and this is a version performed by Kuana Torres Kahele for the High Sessions Project. you can find a video of this performance on the Hi*Sessions YouTube channel link in the show notes. So why are we using this song here? Well, because it was written to commemorate the arrival of electricity in Kaneohe on the windward side of Oahu, and it happens to mention the old telegraph wire. So of course as we discussed in this episode, some of the undersea cables that are used today for internet still run over or across the same pathways that were used to run telegraph wires, so I thought it was a nice little thing to include here at the end. Thank you so much to Kuana Torres Kahele and Hi*Sessions for allowing us to use this song. Mahalo for listening and see you next time on Transmissions from Hawaii!