00:10

Simone Ross: Jack, I would love you to tell us what Esri is and also why GIS is so important.

00:16

Jack Dangermond: So it is a company, it builds software products that are used by millions of people. Kind of like a platform technology, but not literally platform. It builds tools that help people do their work better. And that's a very general statement, but helps them do their work better using geography as a science and visualization as a science and technology to help them make better decisions, or help them be more efficient or help them communicate what they're doing better It's kind of mapping. I mean, the way normal people would think of it as map-making. So this organization has 350,000 organizations that we support. They're our customers, you might say. And they range from NGOs, thousands and thousands of them, working in conservation or humanitarian affairs, to large corporations, but our majority of users are in the public sector, in cities and counties, in national government agencies, and they're basically running the world, that's the way I would say it.

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SR: So right now, we hear a lot about companies using tech to improve the world, but it sounds like that has always been baked into your DNA.

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JD: I grew up as a young kid in a nursery, my parents were servants, and they started a little nursery to help put me through school, that's the way I saw it. They were immigrants and they grew plants. They were attracted to landscaping, which I grew up understanding, so I went to design school, first environmental design school and then landscape architecture and then city planning. And in that progression, I came to understand very clearly the idea of problem-solving, because that's what design really is about, you see a problem and you come up, creatively, with something that solves the problem. And at Harvard, I started to get engaged with systems and computing. And I realized, wow, this was in the '60s, you know, when the environmental movement was still just in its birthing, I saw, "Wow, you could actually apply tech to environmental design." And so this idealism that often happens when you're in school, you know, "I can really do something!" -- well, I loved the idea of taking systems theories and technology and applying it to environmental design problem-solving.

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SR: Do you call Esri a tech company?

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JD: We started doing little projects, you know, locating a new town, locating a store, locating a transmission line, doing environmental studies as a foundation, using tech, to be able to make decisions, which were largely design decisions or planning decisions. And we did that for about 10 years. Just gradually growing as a professional services company, all the time continuously innovating tools that would help us do our projects better. And this idea of continuous innovation. I mean, we invented some of the first digitizing tools for maps, we invented some of the first computer map-making tools. We invented the first spacial analysis tools that were commercial in nature. And over that decade or so, customers began to say, "Gee, I'd like to do that work that you're doing, Jack." So we started to think about the idea of a product, that is, our technology that we applied on project by project could actually go into a product that people could use everywhere. And the big idea of this product, Simone, was the integration of information using geographic principles. Bringing all the different factors together to not only first help us do the projects, but then build these systems that help other people do the projects, and then later build systems. So we went from a project company to a product company that built systems that helped organizations do their work better.

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SR: What you're doing, I believe, is sort of the integration of human and built systems with natural systems. And then helping people visualize that and figure out then how they can design and build for that in a better, smarter way. Is that accurate?

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JD: That's one aspect of it. We sometimes call that geodesign. We digitize or abstract geography, the science of our world. You know, Simone, all of the factors that you think about, I think of as layers. Physical features, environmental features, demographic features. We bring all of those things together in a GIS and then by overlaying those things, we can actually do better designs. We design with all the factors holistically. That's what actually, as a student, got me excited, because I saw you could bring all of the "ologies," all the geology, the sociology, the climatology, all together, and then make better decisions on that, so I think of geography as the mother of all sciences, because it's an integrative technology. And then digital geography, what we call GIS, allows us to be able to use that instrument to empower the transformation of how people make decisions. They can look at the whole, not just one factor, not just making money, not just conserving land, not just this or that. It's optimizing many factors at the same time.

06:03

Yeah, so in the retail sector, people like Starbucks or Walgreens or Walmart, all the big retailers, both here in the US but in the UK, all around the world, use geographic factors to pick the right

location. They look at the demographics, the traffic, and then the large insurance companies and reinsurance companies look at all the different factors that are necessary to understand risk. And they overlay them and they model them and they visualize high-risk areas or low-risk areas. In disaster response, whether it's fire, or like today, the big earthquake in Turkey, there's a whole cycle of work that has to happen when disasters happen. You know, response, recovery, all these work activities are underpinned by having good information. And that information is geographic in nature. So disaster response, public safety, health and looking at issues today that are troubling all of us in the areas of social equity. Where is there disparity? And when something like the pandemic happens, or unemployment due to the economy happens, we can look geographically and see these factors all coming together. So it's like your mind does in many ways. I mean, we built a tool that allows you to abstract reality and see it, and then look at all the relationships between these factors in order to create understanding. So Richard Saul Wurman, the founder of TED often describes us as an understanding organization. "You're all about understanding, Jack, it's not about technology. Your users use your tools to create better understanding." And the way he describes it is understanding precedes action. This is essential to our work.

07:57

SR: And it is a platform that you're building, so you're sort of connecting all these different areas of knowledge, right?

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JD: Today, we have what we call Web GIS. So GIS lives in the web with distributed centers of information that are pulling data out, georeferencing, and using location as a way to do the integration. We might call it mashing up different layers from distributed services or distributed sources of information. And our users are now bringing this knowledge together dynamically in things like smart cities or the popular vernacular these days is digital twins. So all of that geographic reality can now be beamed into organizations, whether they be emergency response organizations or utility organizations or government. And any of the different departments, whether they be law enforcement or you know, science, climate change, biodiversity, all of that series of issues that we're facing today can be enriched by not only bringing together the information in real time, real-time measurement seen on maps, but also integrating those like using spatial analysis or location analysis to look at the relationships and patterns. You see, it's not just seeing it, it's also explicitly understanding the relationships between something like breast cancer and pollution that might exist in a particular geography. And saying, "Aha, we can quantitatively understand these different factors and, as a result, respond."

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SR: So you can do that because you are putting all these different layers on and then you help visualize that.

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JD: Visualize it, but also spatially relate them with math and modeling. So it's not just a matter of visually overlaying material, it's a matter of connecting the geometries or the factors or the features on these maps to each other, like your mind does.

10:05

SR: I have to read this, because I don't want to get it wrong. You had said at some event last year, the Geodesign Summit -- which sounds fascinating to me -- you said, "Transformation is not just about change, it's about leaving behind the past to focus on the future." So can you talk a little bit about that?

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JD: Historically, we have been at the effect of the environment. I mean, this is the history of the world. The world constrains us in what we can do as human beings and we often adapt and adopt to various environmental situations. This field of geodesign is about bringing geographic systems and knowledge into the design process so that we can actually be guided by nature and be more sensitive to it so that we can be responsive to the greater forces of the environment and do it in such a way that we can take -- it's thinking of the world as a garden. It's like gardening, you must pull out the weeds, you nurture your plants, you take care of certain things, you make sure things are watered. And at this point, because of the way we are organized, and the way we think and the way our information is brought to us, we don't think as a garden, we don't think holistically, we don't think of the relationships that are in our lives, that are affecting our lives. And as a result, we're careless, we're polluting the environment, we're messing it up. I mean, on steroids, I mean, the world is really in trouble at this particular point. I mean we have the crisis of COVID, but my God, COVID is just a little wave. What's coming behind us is the climate change issue, which is not so easy to fix. There's no vaccine that's simply applied. And then behind that, there's the loss of biodiversity and behind that, it's sort of unraveling what has taken billions of years to be able to put together. And so, as human beings, my sense is we've got to be more responsive to take care of our place.

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SR: It's transformation with science and design as opposed to transformation brought on or foisted on us by rapid tech change. It sounds very deliberate.

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JD: It's very deliberate. Again, when I was a student, I got the vision or thought that we could actually do environmental planning and design and development better by thinking holistically. Bringing all the factors together. And when I launched Esri, we were starting to do projects

better because we could integrate all of the factors into the design projects. Then as we started building systems, they were first small, focused systems for a particular department, like an engineering department in a city or a planning department, or a forest management organization or an oil company. They could do their work better by considering all the factors. Then -- And that transformed the way projects were done, and it transformed human activities in these different departments. From there, we started to move on to the idea of transforming entire organizations. This meant entire enterprises. So from projects to systems to organizational transformation where you could actually have organizations by intention look at all the factors. And we have so many examples of this.

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And now, there's a fourth phase that we're very engaged in. Those three phases involve certain kinds of technology innovation, but the fourth phase is resting on the web with web services, and its intention is not to transform simply one organization at a time or one project at a time, it's to transform society so that we can raise the bar with geographic consciousness and geographic knowledge to see what our human footprint is causing. And this is so transformational, because people don't want to mess up, they want to know what to do and they want to put the foot down in the right location, they don't want to mess up wetlands by intention, they want to design with nature.

14:22

SR: So you're talking about what you call a geospatial nervous system.

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JD: Yes, building a geospatial nervous system will allow us to guide society in such a way. And in a way, it's not somebody guiding others, it's not like that at all. It's like the internet itself. It's an interconnected network of serving knowledge, sharing knowledge, and using each other's knowledge. That is, multidisciplinary knowledge, different kinds of science knowledge to be able to see and understand before action. All we're doing is building tools that interconnect different organizations' information. And independent actors running in independent organizations all around the world are building something I like to call this geospatial infrastructure. And they're layering it on top of the web. It's like one agency is serving their information and another one is able to use it with their own information and therefore make better decisions, make more sustainable decisions. Now, they're still all independent actors. I mean, there's no control, there's no orders from headquarters. What this is is a fabric that's emerging very rapidly.

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Let me give a practical example. The Pacific Gas and Electric corporation, a very large organization here in California, one of the largest utilities in the world, is sharing their outage and utility information over the web with the State of California fire people and emergency management people, so that they can act better and vice versa. So they're sharing and collaborating through geographic information in whole new ways. And the FEMA, the large federal emergency management organization is sharing their emergency management information with states and cities who are overlaying their data on FEMA data, which is overlaying on top of NOAA's information on the weather and the tracking of satellites, and so on. So this web-based, internet-based system is allowing the fusion of information from many different actors. And independently, these actors are able to more holistically solve their problems.

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SR: Do you think we can overcome these challenges?

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JD: Today, both because of our increased consumption patterns and the overpopulation of the planet, we're in severe trouble. So what we can do is, I think, minimize the impact of population, we can optimize the work that we do, we can save energy, we can do all of these various things. And I have a very positive feeling about the future. This is what drives me day and night. I mean, I have had that vision for over 50 years that we must do this. It's not a question of the outcomes, it's the only way that I can think of to create a sustainable future. We must apply our best science, we must apply our best design and critical thinking, we must apply our best systems theories, we must apply our best technologies, in concert, to be able to address the great challenges that we are all facing. And Esri, as an organization, has always been and will always be all about bringing those forces together to be able to support organizations independently doing their work in this more holistic way. That's the big vision.

18:07

SR: So what advice or guidance would you give to a young entrepreneur today who, sort of, wants to use tech and science to, you know, if not save the world, transform the world or improve the world, because obviously, that's where a lot of the hope and the potential is. So as someone who has been doing this for quite some time now, what would your advice be to someone like that?

18:39

JD: Well, there's so many different opportunities to be able to work and contribute in the world. I was very lucky with parents who were servants and they taught me to be in service to others. This was a great value gift. When I went to Harvard, there was also a philosophy there to be in public service, to be able to focus your life, to be able to give back. And Harvard has been a huge contributor to those in public sector. In the UK, Oxford and Cambridge had that same kind of philosophy of growing the next generation that's in public service. So I think service is one of the elements. The second one is really being about staying focused on your vision. For me, my vision was this idea of bringing systems theories and science and technology together to be able to do better problem-solving. First with design and now whole organizations and society in general. That didn't just happen, it was thoughtful time spent by myself and with my wife to think about what we should with our life. And we were really lucky. We found this great thing that we were passionate about. We thought and visualized, "Yes, this is really something we could actually do." We had no idea where it would go, but at least we picked a segment of our interest to be able to follow this passion and we lucked out. And we didn't sell out, we lucked out. We were very fortunate to live very modestly for several decades to build up this organization and stay focused on our purpose. So my suggestion is, find something that you really love, that you really can contribute to, that really supports your idealism, and don't sell out for money or venture capital or borrow money, none of that actually winds up in being able to retain your idealism.

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SR: So I think there is so much happening on the intersection of tech and life science right now that is so exciting, but also at this intersection that you're talking about as well, and very much, I think, will be part of the solutions for us going forward.

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JD: I think that this big step of Web GIS that we're into right now will happen over the next few years. And it's, in some ways, just in time. Like the UN has organized their SDGs, these global sustainability issues, into this Web GIS platform. We're building a system which is bottom-up and country by country, that allows all the SDG reporting to be able to tell the world, like they did with COVID, what's happening with the other 290 indicators. Whether it's, you know, women in politics or whether it's loss of forests or water quality, this is a big deal. So it isn't just organizations anymore. We're starting to see unifiers, integrators of the individual systems into this system of systems, which I think can talk to the world and transform the world. This is essential if we are going to evolve to a society that's sustainable.

21:56

SR: Great. I think that is a perfect place to stop. Thank you so much. This was really wonderful. I'm really, really glad that we got to do this.