

Applications Everywhere: When VR First Went Viral

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Robert J. Marks:

What's happening with virtual reality? That's the topic today on Mind Matters News.

Introduction:

Welcome to Mind Matters News where artificial and natural intelligence meet head on. Here's your host, Robert J. Marks.

Robert J. Marks:

We've been talking to Dr. Tom Furness, who is the grandfather of virtual reality. In a subsequent podcast, we heard about the history of development of virtual reality at the Air Force, which Dr. Furness pioneered. Now, when we left it off last time, the success of the virtual cockpit developed by Tom Furness got the attention of not only the military, but of all of the news outlets from CNN, all the alphabet soup, ABC to ZNN or whatever. But because of that notoriety, he also began to start getting calls from the private sector with problems that possibly his virtual reality could help with. Tom, do you want to take it from there?

Thomas Furness:

You bet, Bob. Thanks for that. As it turns out, of course, this earlier story was over the period of 23 years. I was an officer for five of those years, a military officer. Then basically did the same job as a civil service scientist.

Robert J. Marks:

I got to ask you a question. With all this hype you got from the generals, did you get a promotion?

Thomas Furness:

Well, actually I did. The Air Force was really generous to me. They sent me to England to do my PhD and got some good promotions. That was equivalent to... from a military standpoint, sort of between a colonel and a general by the time that I'd finished after the 23 years. The Air Force was good to me. It was a marvelous place to work because there were a lot of resources, a lot of smart people. We had a problem to solve and we took it seriously of how we solve these problems to help our country and to keep us safe. That was always foremost in our mind, that we are doing a service for the country. Of course, as you know, the military pioneers a lot of technology that eventually ends up in the civilian sector-

Robert J. Marks:

Yes.

Thomas Furness:

... in the consumer marketplace. That's sort of what happened here because as a result of this media exposure that came as a result of my super cockpit and virtual cockpit work, I was exposed to the public. This elicited a number of questions that came my way, including the... One question that came, one of

the first ones I received was from a mother who had watched a program that, apparently I was talking about the virtual cockpit. She called me and said, I watched this program. I want you to know my child has cerebral palsy. Is there anything you can do with this technology to help my child?

Thomas Furness:

Then not long after that, I received a phone call from a surgeon. He told me he was a thoracic surgeon. He was trying to replace a graft on the aorta in the heart, the artery of the heart. He said, I have a real problem because I don't have a navigation system. I'm inside my patient up to my elbow, sort of feeling my way around. My map that tells me where things are located and what I should be doing is actually a CT scan. It's on a light box on the side of the operating room. I'm having to look over to that all the time. What I need is a map that I can look into the patient and see it there. Can I do that?

Thomas Furness:

Then another surgeon said, can you put my eyes inside the patient so that I can look around because I want to do this minimally invasive surgical procedure where I'm on the inside looking out rather than outside looking in? Then there was another phone call from a firefighting company. They said, we have a real problem with firefighters. They walk into these buildings. They're full of smoke. They don't know where the fire is. They don't know if there people were inside. The other firemen are in there. They don't necessarily see them. The person who's directing all of this, the fire chief is on the outside of building with a radio. He doesn't know anything. Is there any way that you can give us basically a cockpit to use inside of a building, a fire and smoke building so we can find our way around? Anyhow, I was getting three or four phone calls a week like this.

Robert J. Marks:

Wow.

Thomas Furness:

My answers to them, these people, that called was said, well, yeah, you could do that. Matter of fact, that'd be the easy to do compared to what I'm trying to do. That's when I realized we're onto something really big. This is a paradigm shift. This is a shift in a way we get bandwidth to and from the brain because we noticed through all the tests that we did in the military cockpits, the virtual cockpits, how easily the crew members learn this. How well they remembered it. The retention was enormous. It was like a much higher bandwidth to the brain. It awakened spatial memory.

Thomas Furness:

I realized at that time, there are lots of applications beyond the military applications for this technology. Again, this was in 1986, '87 time period. I convinced the Air Force that we needed to come up with a longterm investment strategy for this virtual reality technology. What I'd like to do is spend a year building this longterm strategy and sort of take a sabbatical with a travel budget to sort of investigate. They said, okay. I went everywhere. I went to hospitals, to toy companies, to kindergartens, to aerospace companies, to computer companies. Remember this was in '87 time period where there wasn't a microprocessor.

Robert J. Marks:

Yes.

Thomas Furness:

There was not the internet. There were not these things that really do exist today, but what I was able to see and realize, oh my goodness, we're going to have an explosion not only in computing technology, but in the connections of those computers with what's happening with telecommunications and fiber optics and what was going to eventually happen with these optical systems that were we're looking at. But no one was working on the interface. We're still sitting in front of a screen and wiggling our fingers on a keyboard that was designed in the late 1800s. It was clear that we needed to have a shift in a way that we think about the interface of humans to these advanced computing systems.

Thomas Furness:

I put together a proposal as a result of my sabbatical. When I came back home, I said, hey guys, the best thing we can do with this technology is to get it out of the military and get it out into the world where we have all of these pulls, like the people that called me in medicine and education and design and so forth. What I would like to do is establish a lab somewhere in the United States, associated with a university that would concentrate on that side of things, where we could have students who learn about it. They eventually become our missionaries and our evangelists and actually build the technology because you've invested a lot in my education and a lot in this technology, we need to get it out in the world where it'll make a difference.

Thomas Furness:

I would like to do it. I'd like to shop this out and find out who bites on the bullet. As it turns out, I went to many places, MIT and Caltech and Stanford and Carnegie Mellon, the University of Texas, University of Utah, University of North Carolina and the University of Washington. When I walked... I sent a cold call to the University of Washington saying, I have this idea for a lab that would work on virtual reality in advanced computer interfaces. Here's the plan for it. Are you interested? I got back a call from the Dean of the College of Engineering, Ray Bowen, whom you know.

Robert J. Marks:

I know Ray. Yes.

Thomas Furness:

He said, why don't you come out and talk to us? I did. Flew out to Seattle. I walked into his office and there was another guy in the office with him. His name was Ed Steer.

Robert J. Marks:

I remember Ed. Yes.

Thomas Furness:

Ed Steer. Ed Steer introduced himself and said he was the Director of the Washington Technology Center.

Robert J. Marks:

The WTC. Yes.

Thomas Furness:

That's right. I said, well, haven't I met you somewhere before? He said, yeah. He says, I was the Chief Scientist at the Air Force. I was in your lab at Wright Patterson Air Force base. I saw what you were doing. We want it here. They made me an offer I couldn't refuse. They brought me in as a full professor with tenure and gave me some space in Fluke Hall, a budget and with a different kind of report card. They said, okay, your job is to spin off companies. Your job is to generate patents and build a bridge between university and industry. You'll do the regular professor stuff. You'll teach. You'll write proposals and mentor students and all that kind of thing. I was thinking, wow, that's exactly what I want to do.

Thomas Furness:

I want to build stuff and get it out there. Also be able to tell folks what I've learned over this past 23 years. In September of 1989, I moved to Seattle to start the Human Interface Technology Lab at the University of Washington. As a result of what happened... My mandate started with one person, me, a budget, a mandate, and a great university. The fences are really low. What attracted me to UW versus the other universities I went to is that the fences are really low between departments. People work together. I found that that was something. It was unique.

Robert J. Marks:

That is true. I don't think a lot of people realize that in universities, many professors live in their own silos. There's no communication. That wasn't true at UW. That's right.

Thomas Furness:

No. Basically I had the run of the university as all of the professors did and to work with EE and with ME and with bio and material science and civil and computer science and the medical school, middle school, nursing. As a matter of fact, in the end, my lab grew from one person to 120, which included faculty members with students with staff, visiting scholars, things like that. We had funding from the government. We had funding from industry, sort of half and half. This is when we spun off 27 companies. Several of those companies were traded on NASDAQ and a market cap of \$12 billion. This was done with students. This with my students who got turned on fire and took what they were learning in the lab and starting companies from it.

Thomas Furness:

That was the process story of what happened starting in 1989. Here we are, 30 years later. What has gone on during that time? Well, transformational because as you know, we went through several ups and downs in virtual reality.

Robert J. Marks:

Oh. I didn't know that.

Thomas Furness:

It'd be over-hyped and everybody get excited, sort of like artificial intelligence. It'll get high and low. You've been there-

Robert J. Marks:

Yes, I have.

Thomas Furness:

... in the whole neural net stuff, but we survived those times. In the end, the lab actually propagated to New Zealand and Australia.

Robert J. Marks:

You have HIT Labs at the University of Canterbury and the University of Tasmania. That's a fun word to say because I usually think of Bugs Bunny and the Tasmanian devil.

Thomas Furness:

That's right. I've seen some real Tasmanian devils.

Robert J. Marks:

Have you? What are Tasmanian devils? Are they little-

Thomas Furness:

Well, let me tell this story about that.

Robert J. Marks:

... doggie things or what?

Thomas Furness:

Here we have the HIT Lab that has 120 folks in it and spinning all of these companies. We have students from... It's a ubiquitous lab. We have students from every department of college of engineering with a section of chemical engineering. We even had material science and engineering and bio and electrical and mechanical and industrial and so forth, but we also had students from art, drama and music, oceans and fisheries, medical school, dental school, nursing school, geography, the college of the built environment, architecture. These were students that actually lived in the HIT Lab. They were there in terms of... That was where their office was. What I would do is organize these students into clusters of four members.

Thomas Furness:

They would be in this little sort of bullpen with four of them. One would be a psychology major. One would be a EE major. One would be oceans and fisheries and the other, a drama PhD. You say what? You say, yeah. What I do is I seed them with a problem to solve. Low and behold, these kids would generate several patents a week.

Robert J. Marks:

Seriously, a week?

Thomas Furness:

Yeah. One year, we had more patents in the HIT Lab than all the rest of the university combined. The reason for it was because of the different perspectives. You'd have these different ways of looking at problems like the blind men around the elephant, right?

Robert J. Marks:

Mm-hmm (affirmative).

Thomas Furness:

Each of them have their own perspective. They think that's what an elephant is like. When in fact when they start comparing notes with the other blind people, they finally figure out it was bigger than that and there're different ways of looking at it. That's what we found happening with these students. They had their own lexicon of the way they talk about things, but they had to learn another lexicon from a different perspective. It was amazing to see the product. These kids were on fire. I couldn't get them to go home. They just loved it, the stimulation that came from that.

Thomas Furness:

Then of course, what we had fuel the fire was we had a virtual world's consortium. This was 50 companies that helped support the laboratory. They would pledge \$50,000 a year or equivalent in kind to be a member of this consortium to see what was going on. They didn't get anything for it other than information and of course, access to our students. They showed up. The students would present to these consortium members. Again, the 50 of them, we had Microsoft and Boeing and Sun Microsystems and at the time, digital equipment corporation and Broken Hill Proprietary, the largest company in Australia, from all over the world. We had seven companies from Japan. These people would show up to see what was going on in this phenomenon of how these students from diverse backgrounds, of transdisciplinary background were working together because they'd never seen it before.

Thomas Furness:

Then what we saw happening was these people were starting to talk to each other. They didn't go to conferences where they... They went to conferences with people in the same business, but they'd never been to conferences where you had a people from Chevron sitting across the table from a Nike executive. They started comparing notes and starting projects together. They loved it. It was quite an enterprise that was underway. That's how all these companies got spent off, the 27 companies. Not only a combination of the kids, but the venture capitalists started hanging out saying, do you have something for us to invest in? We did. Things got started that way.

Robert J. Marks:

Excellent. Well, I tell you what. Tom, I'd like to talk about some of these spinoff companies and some of the new technology and the state of the art of virtual reality in a subsequent podcast, if that's okay.

Thomas Furness:

You bet.

Robert J. Marks:

Okay. Great. We've been talking to Dr. Tom Furness at the University of Washington. He was the grandfather of virtual reality and is still active in the field today. We're going to talk to him more next time on Mind Matters. Until then be of good cheer.

Conclusion:

This has been Mind Matters News with your host, Robert J. Marks. Explore more at mindmatters.ai. That's mindmatters.ai. Mind Matters News is directed and edited by Austin Egbert. The opinions expressed on this program are solely those of the speakers. Mind Matters News is produced and copyrighted by the Walter Bradley Center for Natural and Artificial Intelligence at Discovery Institute.