Voyager-1, REALLY Out in the Boondocks

By David Nakamoto

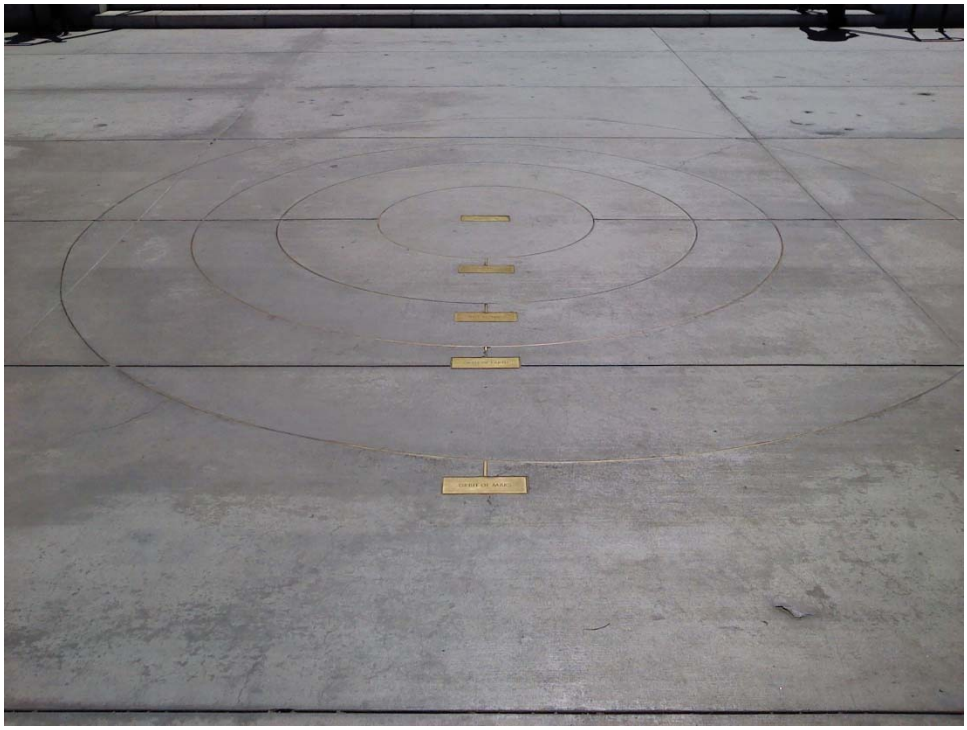
In a recent email one of our members, Steve Cooperman, stated that Voyager1, on the scale of the Solar System model on the mall in front of Griffith Observatory, would be at the sign that says “Restrooms” by by the public parking lot. But what does that mean, I wondered? So I undertook the journey myself one Sunday afternoon.

This is the Sun, 1/2 of an inch wide, or about the size of a dime, right in front of Griffith Observatory. Notice that the orbit of Mercury is wrong; it should be off-center and slightly elliptical. The original workman did it wrong, and when the observatory tried to correct it, the workman got it wrong AGAIN ! Try and explain astronomy to a layperson . . .

But now, keep in mind how small the Sun is on this model. Smaller than a dime, despite being 865,000 miles in diameter in real life. I didn’t have anyone with me, so I couldn’t have someone hold a dime up while I took my journey into space . . .

From the Sun, it took three steps and 2 seconds to get to the orbit of earth on the model. The average distance between the Sun and the earth is one Astronomical Unit, or 1 AU. For measurements within the solar system, the AU gives some idea of the relative distances between objects, and is much more convenient than juggling large numbers like 93,000,000 miles, which is also 1 AU. Another way to give distances is the time it takes light to get from one object to another. It takes about 8.3 minutes for light to travel from the Sun to the earth, or two seconds less than 500 seconds, so I was traveling at 500/2 or 250 times the speed of light, or if you’re a Trekker, about warp 6.3 on the original series speed scale ($v = w^3c$), about the Enterprise’s top safe speed.

So I gave the order, “Floor it, Mr. Sulu!” and continued my journey.



Here I was standing roughly where the asteroid belt should be. Notice that they did get Mars right; it is slightly elliptical and definitely off-centered. Already the dime-sized Sun looks small.

And now for a Big Leap . . .

And now we're at Pluto's mean distance from the Sun, 77 steps and about 50 seconds walking time. Pluto's mean distance is around 40 AUs, and light takes 5.5 HOURS to travel that distance. I stopped here because this is the last bastion of the Solar System if you include just the planets and you recognize

Pluto as a planet. From here you can turn around and look to where Voyager 1 is, and this is what you see . . .

See the restrooms? They're dead center in the image. This is where Voyager 1 is on the scale of the Griffith Solar System, about 3 times the distance or so from Pluto as Pluto is from the Sun ! So I walked this far only to find that I wasn't even halfway to Voyager !

Well, I kept on walking until . . .

177 steps and about 120 seconds later, I was there at last, in front of the outdoor restrooms and about 200 yards from where I started. This is approximately Voyager 1's distance from the Sun, about 127 AUs. Light from the Sun would have to travel for 17.5 HOURS to get to Voyager 1. Pluto's distance from the Sun is approximately where the tree is, the one below the right dome holding the observatory's coelostat. And where is the Sun? Just in front of the observatory, behind the monument to Astronomers past. Talk about being in a lonely place ! Along the way, I had passed through the Kuiper Belt, the nearest reservoir of comets bound to the Solar System, thought to be somewhere between 33 to 50 AU away from the Sun, so Voyager 1 is well beyond it. Voyager-1 is also well beyond most Trans-Plutonian objects, except for Sedna which as an aphelion (greatest distance from the Sun) of 937 AU, approximately 1475 yards away, or 200 yards beyond Mt Hollywood directly north of the observatory, or, if you'd like, about where the corner of Hillhurst and Los Felix is.

But there is an even more distant swarm of bodies beyond the Solar System but still connected to it . . . barely. That is the Oort Cloud, thought to start about 25,000 AU away, the theoretical swarm of, and the source of very long period comets. Comets Ikeya-Seki and West were thought to come from The Cloud (sorry, couldn't resist ! ☺) So where is it?

On the Griffith Solar System scale, it starts roughly at the distance of Azusa, about 23 miles away, about 7.7 hours of walking time, assuming you can walk directly from here to there. You can't see Azusa directly from Griffith, but in the image above you can see the very distant line of hills that marks the eastern edge of the San Gabriel valley where Azusa is. The black hills in the foreground are Glassell Park and other nearby towns. So on this scale, it's hard to imaging that the Oort cloud could be connected to the Solar System . . . until you get to the next known object, Proxima Centauri.

And I can't show you where Proxima Centuri is, because I can't photograph Las Vegas from Griffith ! Proxima is 250,000 AU(!!) from the Sun, and light takes around 4.3 YEARS to arrive from there to the

Solar System, or walking there, or going at warp 6 onboard the Enterprise of Kirk's era, about 77 hours or 3.2 days ! This gives you a real sense of how isolated our Solar System is. There must have been a lot of leisure time on the Good Ship Enterprise back in Kirk's day.

Yes, Voyager is the most distant object that man has sent to the stars, but it's still in the Solar System's ball park, or rather in the public parking lot at Griffith. And the Solar System is a lot bigger than that.

Yup, Voyager 1 has quite a ways to go yet. ☺