# The Archetypal Cycles of Virtual Reality

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Virtual reality is a new immersive computing paradigm that can hack our senses and convince our brains that computer-generated experiences are real, which raises fundamental questions about our understanding of reality. VR provides a direct experience of how our reality is mediated through our perceptions, which blurs the boundary between subjective and objective reality. In this article, I will analyze major outer-planet astrological cycles since the 1960s to track the evolution of virtual reality technologies, as well as to gain insight into the transformative potential of this new communication medium.

Because technology goes through many different phases of development, it is difficult to isolate any single astrological moment. However, researcher Simon Wardley has modeled the evolution of technology through four different phases that make tracking the astrological evolution of a technology more feasible. These phases include breakthrough innovation, custom-built systems, consumer products, and then eventually the creation of a commoditized utility.[1] Wardley's technology evolution model is helpful in understanding the key phases that a technology goes through as it increases in ubiquity of market demand as well as in the certainty of available supply. This model starts with a breakthrough genesis moment when an initial prototype is synthesized within academia, government research, or industry. The technology then matures to bespoke systems that are hand-crafted for specific industry use cases. It then moves into a mass-produced consumer product or service and, if it becomes popular enough, it eventually turns into a ubiquitous utility and commodity such as electricity, broadband Internet, or cell phones.

We can track the evolution of virtual reality through the first three of these phases by looking at the major outer planet transits over the past sixty years. The invention of virtual reality as well as major two-dimensional human-computer interaction paradigms occurred during the Uranus-Pluto conjunction of the 1960s (1960-1972). Some of the first custom-built enterprise VR systems were launched during the peak of the VR hype cycle in the early 1990s during the Uranus-Neptune conjunction (1985-2001), and there were also a number of failed VR commercial ventures during this alignment. VR had an unexpected commercial resurgence during the current Uranus-Pluto square (2007-2020) with the Oculus Rift Kickstarter in 2012, which led to its subsequent purchase by Facebook for two billion dollars in 2014. Finally, all of the major consumer virtual reality headsets were launched during the Saturn-Neptune square from November 2014 to October 2017.

A similar unfolding of outer-planet transits occurred after the invention of the Gutenberg press in 1455 during the Uranus-Pluto conjunction of 1450-1461. The Gutenberg press enabled the mass publication of books, which democratized the capture of information and knowledge in a new way and led directly to the Renaissance, a pivotal and transformative period in human history. In our era, computers can be seen as analogous to the Gutenberg press in the way they have lowered barriers for publishing text, photos, and videos. Virtual and augmented reality technologies are beginning to democratize access to human experience in a similarly new way, which may lead us toward a new Renaissance.

The evolution of VR and AR correlates with the major outer planet transits of the 1960s, the 1990s, and the 2010s. These correlations hint at the profound transformative potentials of this new communication medium. Tracking the evolving technological landscape in recent years leads one to the conclusion that the future of computing will most likely be increasingly immersive and interactive. In brief, we appear to be in the midst of a paradigm shift moving from the Information Age to what might be termed the Experiential Age with immersive technologies at the heart of this shift.[2] This article will discuss what those emerging technologies are, what outer-planetary transits mark their progression, and finally, what this new technology might herald.

## Breakthrough Innovation: The Origins of Virtual Reality in the Uranus-Pluto Conjunction

A key figure in the early innovative stages of VR is Ivan Sutherland, who had a remarkable year at MIT from 1962-1963. He created "the first interactive graphics program, the first non-procedural programming language, the first object-oriented software system, all in one year."[3] The Sketchpad was a brilliant breakthrough that used a light pen to create the first graphical user interface to a computer. Sutherland's groundbreaking Ph.D. thesis project on the Sketchpad was submitted on January 7, 1963 as Jupiter was opposing the Uranus-Pluto conjunction.[4] Throughout 1962 when he made his breakthrough technological advances, transiting Jupiter was conjunct his natal Jupiter and Uranus was opposite his natal Jupiter during the Uranus-Pluto world transit. Uranus represents the invention of new ways of interacting with disruptive technologies through "lightning-like flashes of insight" while Pluto represents the elemental depth and intensity of the technology that would shift the fundamental power dynamics of society through the democratization of technology. Jupiter's involvement correlates to the growth and amplification of the advancement of these more intuitive computing interfaces beyond a keyboard.[5]

In 1963, Sutherland was drafted into the National Security Agency and was eventually transferred to the Advanced Research Projects Agency (ARPA), which is the organization responsible for funding a number of computing projects, including the Internet. Sutherland wrote a research paper for ARPA called "The Ultimate Display" in 1965, which laid the groundwork for combining computer-generated graphics with head-mounted displays. Sutherland was inspired by the potential of visualizing a "mathematical wonderland" through "a display connected to a digital computer" in order to "gain familiarity with concepts not realizable in the physical world."[6]

Computer architect Fred Brooks saw Sutherland speak about his vision of the ultimate display in 1965 during the heart of the Uranus-Pluto conjunction. It changed his life:

> I happened to go to the Fall Joint Computer Conference in 1965 in which Ivan Sutherland gave this stunning, absolutely stunning speech that envisioned all of VR from the very beginning. What Ivan said was, "Don't think of that thing as a screen. Think of that thing as a window. And through the window one looks into a virtual world. The challenge to computer graphics for the future is to make the picture in the window look real, sound real, move real, interact real, and feel real." And I knew then that interactive computer graphics was what I wanted to do towards that goal.[7]

At the end of Sutherland's ultimate display thought experiment, he describes a technology that resembles the Holodeck depicted in *Star Trek*:

> The ultimate display would, of course, be a room within which the computer can control the existence of matter. A chair displayed in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal. With appropriate programming such a display could literally be the Wonderland into which Alice walked.[8]

In 1966, Sutherland returned to academia at Harvard University where he would pursue his vision of creating the ultimate display. While working on a "Remote Reality" system for Bell Helicopter, he and his team "replaced the TV camera that fed the primitive 'head-mounted display' with a computer connection. Worn by the user it was so heavy it had to be suspended from the ceiling, and the graphics comprising the virtual environment were simple wireframe model rooms."[9] The first virtual reality prototype was completed in 1968 and named "The Sword of Damocles." Sutherland published his breakthrough system in a paper called "A Head-Mounted Three-Dimensional Display."

Sutherland's paper was presented at the Fall Joint Computer Conference from December 9-11, 1968 during the same Jupiter-Uranus-Pluto conjunction that saw the Moon landing and the Woodstock festival. This was the same conference where Douglas Engelbart presented his famous "Mother of All Demos," which integrated key features that would go on to define the next fifty years of computing, including "windows, hypertext, graphics, efficient navigation and command input, video conferencing, the computer mouse, word processing, dynamic file linking, revision control, and a collaborative real-time editor."[10]

The revelatory breakthroughs in human-computer interaction and immersive computing were being independently replicated in other parts of the US military. Dr. Tom Furness is a key figure in the innovation phase of VR, doing independent and parallel work within the Air Force starting in 1966 with what would eventually become the virtual cockpit program.[11] Fighter jet technology at that time had a number of problems to solve, including how to aim without turning the entire airplane, how to represent information from sensors with limited screen real estate, and how to help the pilots make sense of and operate the controls amidst all of this complexity. It was from

pragmatically solving these problems of Air Force pilots that Furness created some of the foundational components of virtual reality. As Furness told me in an interview:

> In 1966, 67, 68, there was this family of control systems, head-tracking systems, and head-mounted displays that I developed that we demonstrated and tested in real aircraft to see how we could use the head position of the pilot to aim systems on the aircraft. How we could use these virtual displays to take the place of any kind of physical display in the cockpit, because you couldn't make them large enough. But you can make the virtual display any size you wanted to. So this gave us a better way of coupling with the systems on the airplane. Then eventually we put these two together, the tracking along with the display, and that was basically VR.[12]

Furness reveals that virtual reality technologies have been actively solving data visualization and operational control problems for fighter jet pilots since the mid-Sixties, which means that the foundations of virtual reality technologies were being integrated in two different systems during the Uranus-Pluto conjunction starting in 1965, and peaking in the Jupiter-Uranus-Pluto conjunction in 1968.

A number of other significant events happened within the orb of the Uranus-Pluto conjunction. The first transmission of the Internet took place in October 1969. The World Wide Web would later prove to be a revolutionary breakthrough during the Nineties, fueling science fiction visions of the Metaverse that inspired many other key players of virtual reality. Additionally, the two leading Central Processing Unit (CPU) manufacturers were founded during this period: Intel on July 18, 1968 and Advanced Micro Devices on May 1, 1969. Finally, Ivan Sutherland left academia in 1968 to found Evans & Sutherland, which marked the birth of the computer graphics industry.

## Custom-Built Systems and Mainstream Hype for Virtual Reality During the Uranus-Neptune Conjunction

Using Wardley's technology evolution model, we can see that VR moved from the original prototypes in the late Sixties into the custom-built bespoke systems up until the mid-Eighties. Evans & Sutherland created custom-built computer graphics systems for private aerospace companies, military training, flight simulation, and European car companies. Furness continued to build various different custom VR and AR systems for the Air Force from 1971 to 1989. Silicon Graphics, Inc. was founded in 1981, and would become a key provider of 3D graphics computer workstations. Because most of these systems were either classified military programs or for private companies who wanted to use VR as a competitive advantage, there is not a lot of information available to the public. After its inception in the Sixties, VR entered into an underground winter phase until the mid-Eighties, when it reemerged largely through popular film and book narratives that used the technology to imagine possible futures.

Tom Furness also worked on the Air Force's Super Cockpit program from 1986-1989, at the beginning of the Uranus-Neptune conjunction of 1985-2001, until leaving the military to found the

Human Interface Technology Lab at the University of Washington in September 1989. The HITLab would go on to do vital research proving VR's efficacy in medical and education applications, as well as create breakthrough augmented reality technology including the Virtual Retinal Display, which was patented on Nov 14, 1995.[13] This virtual retinal display shoots photons directly into one's eyes to create photorealistic augmented reality experiences. HITLab graduate Brian Schowengerdt would use the expired patent for the Virtual Retinal Display to co-found Magic Leap in 2010.

These emerging narratives drove both excitement about VR and expectations that could not be met, but which provided an undercurrent of awareness and interest in the technologies, paving the way for later breakthroughs. The first virtual reality products were released during the Uranus-Neptune conjunction of 1985-2001, VR went through a mainstream media craze, and there was some key pop culture that spread awareness of the vast potential of VR to the minds of millions. However, the VR media hype bubble burst by 1995 when the VR technology proved to be too expensive and not ready for home use.

Tarnas explains in *Cosmos and Psyche* that the combination of Uranus and Neptune correlates with technological innovation, increased flow of information, instant communication, access to new sources of data, radical changes in consciousness, increased internal experience of life, ceaseless stream of visual stimuli, dissolving of individual and collective boundaries, and plenty of addictive, drug-like, trance-inducing components.[14] The exact passes of the Uranus-Neptune conjunction started in January 1993 and culminated with a Jupiter square to those planets in September 1993, which coincided with the explosion of the World Wide Web. According to *The Encyclopedia of New Media*: "In January 1993, there were only 50 Web servers in existence, but in October 1993 the number of Web servers increased to approximately 500."[15]

The archetypal complex of Uranus and Neptune seeded the contemporary web, correlating with the ways in which the Internet has revolutionized nearly every aspect of our digitally mediated lives over the past twenty years. It also describes the character and nature of virtual reality in that cutting-edge technologies (Uranus) provide immersive visual experiences that cause a trance-like loss of the boundaries of one's sense of self (Neptune). The exploration of virtual worlds allows one to consider alternative realities and deconstruct long-established boundaries and structures of reality. Virtual reality includes more integrally embodied interactions through gestures, head movements, and conversational interfaces, which represents a new immersive computing paradigm that is much more holistic and participatory than previous paradigms.

Jaron Lanier founded VPL Research in 1984, where he popularized the term "Virtual Reality" in 1987. 1989, during a Saturn-Neptune conjunction and a Jupiter-Uranus opposition in addition to the longer Uranus-Neptune conjunction, was a particularly potent time for many foundational VR technologies. This was the year VPL created some of the first commercially-available VR systems, including the VPL EyePhone VR headset, the DataSuit input controller, and the Power Glove, which was a collaboration with Nintendo. Nintendo released the Game Boy in July 1989, which game developer Jesse Schell identifies as the precursor to smart phone-based mobile computing.[16] Nintendo's wildly popular Nintendo Entertainment System was released during the previous Jupiter-Uranus conjunction in 1983, and the Game Boy innovated the user interface paradigms that would be used in early mobile phones. These mobile and immersive computing

interfaces initiated a break away from desktop computers using a mouse and keyboard, and laid the groundwork for more experiential and intuitive methods for interacting with technology.

The Virtuality Group was also founded in 1985 at the beginning of the Uranus-Neptune conjunction, and they created the "first mass-produced, networked, multiplayer VR location-based entertainment system" starting in October 1991.[17] Their first-person shooter game *Dactyl Nightmare* used technology priced at $60,000, making it affordable only for arcades.

The film *The Lawnmower Man* brought the term virtual reality into the mainstream. Released on March 6, 1992 with the Sun sextiling the Uranus-Neptune conjunction, it featured esoteric themes about how VR technologies could unlock untapped human potentials such as accelerated learning and psychokinesis. The character Jobe says, "I realize that nothing we've been doing is new. We haven't been tapping into new areas of the brain. We've just been awakening the most ancient. This technology is simply a route to powers that conjurers and alchemists used centuries ago. The human race lost that knowledge and now I'm reclaiming it through virtual reality."[18] Director Brett Leonard also featured the use of VPL's EyePhone VR headset in the cinema's most realistic depiction of VR's potential for playing video games, which would later inspire VR pioneers like Palmer Luckey. The Uranus-Neptune complex correlates with an influx of esoteric, spiritual, and mystical impulses, and the use of technology to connect to the mysterious and enchanted aspects of reality. With this complex, there can also be an urge to overcome dualistic separations between spirit and matter, as well as between mind and body.

Another key figure from this time period is John Carmack, an American game programmer who made a number of key innovations in 3D graphics that enabled him to create the wildly popular games *Wolfenstein 3D, DOOM,* and *Quake. DOOM* "is considered one of the most significant and influential titles in the video game industry, for having ushered in the popularity of the first-person shooter genre."[19] Carmack was born on August 20, 1970 and has a Sun-Mars-Saturn-Neptune T-square. His chart correlates with his central role in defining a video game genre involving individuals killing opponents (Mars-Saturn) from an immersive (Neptune), first-person perspective (Sun) within realistic (Saturn) virtual (Neptune) three-dimensional worlds.

*Wolfenstein 3D* was released on May 5, 1992 while transiting Pluto opposed Carmack's Saturn and squared his natal Mars. *DOOM* was released on December 10, 1993 when Pluto was squaring his Sun-Mars and conjunct his Neptune, both during the Uranus-Neptune world transit. These first-person shooter games represented a deeply visceral (Pluto) and immersive experience (Neptune) of killing enemies (Mars-Saturn) in virtual worlds (Neptune). These games changed the trajectory not only of Carmack's career, but also the entire video game industry as the first-person shooting genre has persisted for more than twenty years. This first-person perspective and the process of efficiently creating 3D worlds would also prove to be vital components of virtual reality.

In June 1992, also during the Uranus-Neptune world transit, Neal Stephenson published his science fiction novel *Snow Crash*, which features characters moving in virtual worlds as avatars and interacting with other people's avatars within what he coined the "Metaverse." *Snow Crash* would go on to inspire many computer programmers, including Michael Abrash, the author of a number books on computer graphics, including *Zen of Graphics Programming*. As Abrash put it, "I had read *Snow Crash*, and realized I could make 90 percent of it work."[20]

Abrash would collaborate with Carmack on *Quake* in an attempt to realize his dreams of the Metaverse through networked gaming. They parted ways after a couple of years, but they would collaborate again nearly twenty years later when they would both join Oculus to work on virtual reality. Oculus VR is the company founded in 2012 by Palmer Luckey, who happened to be born during this zeitgeist of the Uranus-Neptune conjunction on September 19, 1992. We will hear more hear about how Luckey revived virtual reality from obscurity in the next section.

In December 1993, *WIRED* predicted that virtual reality would be one of the "Seven Techno Wonders of the World," calling it a "beacon that draws creative energies toward the culmination of computing."[21] But the wave of idealism and excitement about virtual reality would soon come to a crashing halt. On July 21, 1995, Nintendo tried to capitalize on 3D stereoscopic gaming with the Virtual Boy, but it was too expensive, gave players a headache, had poorly-designed games, and was extremely awkward to use. It also did not have any head-tracking, and so it is not generally considered to be true virtual reality. Nevertheless, it became a symbol for the catastrophic commercial failure of early VR technologies. By 1997, the Virtuality company sold away the rights to their $60,000 VR machines after a dramatic drop in demand, causing their manufacturing division to go insolvent.

According to *CyberEdge Journal* founder Ben Delaney, "to a large extent, the Internet and the World Wide Web did the VR community a tremendous favor. [The Internet] became the new breakthrough technology that was going to amaze everybody. The mainstream press found other, more exciting things to talk about; especially toward the end of the '90s when very few of the wild [VR] promises had been fulfilled. People just walked away from it."[22] This period is marked by the failure of a number of high-profile, commercial virtual reality projects including VPL and Virtuality, but that does not mean that VR completely disappeared.

Some of these other VR companies included Sense8 and Fakespace Labs (both founded in 1990). They created custom-built bespoke VR applications for military training, flight simulation, academic research, and engineering visualization applications. The Cave Automatic Virtual Environment (CAVE) was also announced on June 1, 1992, which is a projection-based, immersive room-scale system used by academics and industry for the next 25 years.[23]

The film *The Matrix* is the last major highlight of the Uranus-Neptune conjunction period in the history of VR. It was released on March 31, 1999 during a nearly exact Saturn-Neptune square. *The Matrix* introduced many philosophical questions about the nature of reality using a Saturn-Neptune metaphor of enslaved human batteries in a Saturnian reality living in an escapist visual kaleidoscope of Neptunian illusion. Notably, *The Matrix* also provided popular culture with the clearest depiction of a fully-immersive virtual reality that we may eventually experience in reality.

However, by October 1999, when Carmack was asked about whether he was still interested in creating online virtual worlds using his *Quake* engine, his response was less enthusiastic than it had been previously. He replied: "Making *Snow Crash* into a reality feels like a sort of moral imperative to a lot of programmers, but the efforts that have been made so far leave a lot to be desired."[24] Carmack would have to wait until 2012 when Palmer Luckey would put all of the necessary hardware pieces together to create the revolutionary Oculus Rift virtual reality head-mounted display, finally rendering the early promise of those VR pioneers an affordable consumer product.

## Release of First Consumer Products: Virtual Reality Renaissance with Uranus-Pluto Square

The sudden and unexpected resurgence of VR began with the successful launch of the Oculus Rift Kickstarter by Palmer Luckey in August 2012 during the first exact square of Uranus and Pluto. The original seeds of virtual reality were planted by Ivan Sutherland during the Uranus Pluto conjunction of the Sixties, and the next axial alignment, the 2007-2020 square, has seen consumer VR start to spring to life. Crowdfunding websites like Kickstarter have enabled a new form of technological empowerment, innovation, and creative eruption where deeply transformative and powerful technologies like virtual reality were able to gather enough support from enthusiastic gamers.

Palmer Luckey was a gamer and hardware hacker who liked to dismantle his game consoles to see if he could build something new with them. He was interested in "portabilizing," which he describes as the "art of turning mostly vintage game consoles into self-contained portable units with built-in control screens, batteries, etc."[25] On August 22, 2009, he made his first post to the Meant to Be Seen forum, which was where many of the stereoscopic 3D video gaming enthusiasts were gathering.[26] Luckey created four VR prototypes from August 2010 to November 2011, modifying existing VR headsets with the latest cell phone screens and inertial measurement (IMU) technologies.[27] He took his fourth VR prototype to The Sundance Film Festival in January 2012 to support immersive journalism pioneer Nonny de la Peña in showing her VR experience *Hunger in LA* to leaders within the film industry, which received a lot of attention from the national media.[28]

Luckey announced his intent to launch a Kickstarter on the Meant to be Seen forum on April 15, 2012. He wrote that he was going to release the Oculus Rift as an open-source kit for hardware makers and said, "I am listing the organization as 'Oculus,' I plan on using that name on my VR projects from here on out. The HMD itself is tentatively titled 'Rift.'"[29] This forum post caught the attention of 3D programming legend John Carmack, who private messaged Luckey asking if he could receive a loaner unit of his Rift. According to *WIRED* magazine, "Palmer, who idolized Carmack, shipped it off to Texas immediately - 'no NDAs, no signing anything,' Carmack says. 'It was one of two prototypes that he had.'"[30]

Carmack ported the latest version of *DOOM 4* to work in virtual reality with Palmer's duct-taped Oculus Rift prototype, and he then took it to the E3 gaming conference on June 6-8, 2012. This conference was during the first exact pass of the Uranus-Pluto square, while transiting Uranus was opposite Carmack's natal Uranus. These circumstances created the context for the story of a technological breakthrough (Uranus) that could finally bring virtual reality to the masses (Pluto). Carmack's press briefings went viral and created a lot of buzz for Luckey's upcoming Kickstarter campaign. *WIRED* magazine said that Carmack "brought that early prototype to the E3 videogame show, reintroducing VR to the popular conversation for the first time since *The Lawnmower Man*."[31] VR had not enjoyed this much attention since the Uranus-Neptune conjunction of the Nineties, when Carmack's original *DOOM* was released, pioneering 3D gaming.

Luckey launched his Oculus Rift Kickstarter on August 1, 2012, and his $250,000 goal was reached within just a few hours of the launch, which would go on to raise nearly ten times the goal for a total of $2.4 million.[32] After many production delays, Oculus VR started to ship out the first

development kits for $250 in April of 2013, just a few weeks before the third exact pass of the Uranus-Pluto square. These virtual reality developer kits represented a revolutionary new computing platform that was being delivered to independent creators who were empowered to start experimenting with this new communication medium. At only $250, this immersive technology was democratized and liberated from the previous cost of over $20,000, which had been prohibitive for most developers.

Then a month later as Jupiter was approaching a T-square with Uranus and Pluto, Oculus VR raised $16 million of Series A venture capital funding on June 17, 2013, allowing for the growth and expansion of technological development. Then six weeks after the fourth exact pass of the Uranus-Pluto square, they raised $75 million of Series B funding from Andreessen Horowitz on Dec 12, 2013. *WIRED* magazine quoted Andreessen Horowitz partner Chris Dixon as saying, "I think I've seen five or six computer demos in my life that made me think the world was about to change, Apple II, Netscape, Google, iPhone . . . then Oculus. It was that kind of amazing."[33]

Then, on March 25, 2014, a month before the fifth exact Uranus-Pluto square formed a Grand Cross with Jupiter and Mars, came the shocking news that Facebook would be buying Oculus VR for $2 billion. Facebook's Mark Zuckerberg described the reasoning behind the Oculus acquisition by saying: "This is really a new communication platform. By feeling truly present, you can share unbounded spaces and experiences with the people in your life. Imagine sharing not just moments with your friends online, but entire experiences and adventures."[34] News of this major acquisition (Jupiter) sent shockwaves across the gaming and entertainment industry, convincing many hesitant content creators that the revolutionary virtual reality technology (Uranus) actually had a legitimate chance of succeeding (Jupiter) this time now that a huge company like Facebook was supporting it (Pluto). At the same time, grassroots supporters of Oculus were extremely upset (Mars) since there was a lot of distrust around Facebook's abuses of power (Pluto) around privacy.

But the Grand Cross saw more than one company benefit from the VR technological boom. A number of major companies had been working secretly on VR technologies for years, and the Jupiter alignment to Uranus and Pluto correlated with a series of shocking announcements from every other major and emerging virtual reality player. Valve showed off their Valve Room demo at Steam Dev Days on January 15-16, 2014 as well as a VR prototype with positional tracking at a Boston Game Jam from May 31 to June 2. Magic Leap quietly announced raising $50 million on February 4, 2014, and Google announced their Project Tango AR smart phone on Feb 20, 2014.

Sony announced Project Morpheus (later renamed PlayStation VR) on March 18, 2014 at the Game Developers Conference after having worked on it for many years. Oculus also announced their second VR development kit with positional tracking at GDC that would start shipping in July. The Silicon Valley Virtual Reality conference was the very first consumer VR conference, which happened on May 19-20, 2014, and is where and when I launched the *Voices of VR* podcast. Then Google shocked everyone at Google I/O on June 25, 2014 by giving every attendee a Google Cardboard headset, which allowed anyone with a modern cell phone to have an immersive VR experience. Most people originally thought a VR headset made out of cardboard might have been a late April Fool's joke, but it was simply the minimum viable product to provide an immersive experience. On February 28, 2017, Google announced that they had shipped over ten million Google Cardboard units, corresponding to Jupiter opposite Uranus and square Pluto.[35]

Leading up to the sixth exact pass of the Uranus-Pluto square in 2014, Oculus announced a partnership with Samsung to create the Gear VR, which allows Samsung phones to be inserted into a mobile VR headset for a high-quality mobile VR experience that was vastly better than Google Cardboard. This direct collaboration between Samsung and Facebook was seen as an unusual business partnership (Uranus) between two powerful companies (Pluto) since Samsung specialized in hardware and Facebook specialized in software. Then Oculus held their first Oculus Connect developer conference in September where they announced yet another huge breakthrough in visual fidelity with the Crescent Bay VR prototype. Magic Leap came out of start-up "stealth mode," announcing to the world that they had raised $542 million of funding led by Google on October 21, and also revealed their first demo video of their digital lightfield AR technology originally pioneered by Tom Furness.

Leading up to the final exact pass of the Uranus-Pluto square, Microsoft announced that they were making a head-mounted augmented reality headset called the HoloLens on January 21, 2015. Then Valve and HTC made the shocking announcement of the HTC Vive on March 1st at Mobile World Congress, showing it to leading game developers at the GDC Expo on March 4-6. The HTC Vive was a revolutionary breakthrough that tracked an entire room with lasers so that one could have one's hands and entire body in the experience. Oculus would not reveal equivalent functionality until Jun 11, 2015 when they announced their Oculus Touch hand controllers.

This was an exhilarating period of breakthrough technological innovations, and content developers needed three years of early access to VR developer kits from 2013 to 2016 in order to bootstrap the content ecosystem. The official consumer launches of every major VR headset happened from November 2015 to December 2016 during the third-quarter square of Saturn and Neptune, which spanned from November 2014 to September 2017. This included the Samsung Gear VR (November 27, 2015), Oculus Rift (March 28, 2016), Microsoft HoloLens development kit (March 30, 2016), HTC Vive (April 5, 2016), Sony PlayStation VR (October 13, 2016), the Google Daydream View (November 10, 2016), the Snap Spectacles (November 10, 2016), and the Oculus Touch Controllers (December 6, 2016). These consumer launches represent the concrete manifestation (Saturn) of products that transcend and dissolve (Neptune) the bounds of the structures of space and time (Saturn) through an imaginal or symbolic simulation of reality (Neptune).

All of the major virtual reality headsets have now launched consumer products, and it would not have been possible without other cell phone and gaming technologies reaching a critical mass. The ubiquity of smart phones has created an ecosystem of affordable high-density pixel screens and sensor technologies that could be miniaturized within a VR headset, and the advances in GPUs and CPUs due to gaming have enabled 3D and immersive real-time graphics to be rendered that are approaching photorealistic qualities.

The previous quadrature alignments of the Saturn-Neptune cycle correlate to the launches of other key consumer technologies starting with the conjunction. In July 1989, Nintendo's Game Boy was released in North America, which dissolved the boundaries of the locations where one could play games in virtual worlds and, as game developer Jesse Schell noted, was crucial in proving out interaction design patterns for mobile computing.[36] Then the BlackBerry 850 phone was released in January 1999 during the first square, which started to blur (Neptune) the boundaries of work

(Saturn) by being able to write emails from anywhere. NVIDIA's GeForce 256 was also released in October 1999, which was the world's first graphical processing unit (GPU), created so that video games could start to render photorealistic images (Saturn-Neptune). The iPhone was released in June 2007 during the Saturn-Neptune opposition, as well as a Jupiter-Uranus square, featuring high-pixel density, multi-touch interfaces, and low-cost IMUs that could detect motion. Smart phone technology has gone from initial consumer launch to mass ubiquity within the past ten years, and created a supply of sensors (Saturn) that enable immersive experiences (Neptune), which have enabled the creation of affordable virtual reality headsets.

Continued advances in GPU technologies have also aided in training machine learning neural networks that have improved computer vision techniques, which are enabling more sophisticated augmented reality (AR) applications. The recent Jupiter-Uranus opposition throughout 2017 has seen Facebook, Snap, Apple, and Google all make major announcements about the future of phone-based AR. It was not expected (Uranus) that every major tech company (Jupiter-Uranus) would announce new technology platforms powered by computer-vision breakthroughs in machine learning (Uranus). Having missed the mobile phone craze, Microsoft is leap-frogging phone-based AR and innovating with their head-mounted AR HoloLens, which was also heavily featured at their recent Build 2017 development conference. These initial virtual reality and augmented reality product launches are the first baby steps toward mass adoption of these immersive technologies.


## Conclusion: The Future of VR and the Path Toward Commoditized Utility

The story of virtual and augmented reality technologies has a clear correlation to the unfolding of the major outer-planet transits over the past sixty years. I have traced above the development of VR through those transits as it has gone from invention to custom-built systems to consumer products moving toward mass ubiquity. It is very difficult to predict when VR is going to achieve this phase of mass ubiquity. I suspect that immersive and ambient computing technologies will reach a level of maturity and mass ubiquity in either eight more years coincident with the first exact alignments of the Saturn-Neptune conjunction and the Uranus-Pluto trine in the summer of 2025, or it could be another twenty-eight years when Uranus opposes Pluto in 2045.

It is impossible, and probably inadvisable, to isolate VR & AR to any specific astrological complex because it has significant connections to so many. What can be said, however, is that the Uranus-Pluto conjunction of the Sixties and the current square have coincided with major public revelations and proliferation of these technologies; The Uranus-Neptune conjunction coincided with immersive technologies that will be liberating the expression of our imagination and creativity from the abstractions of 2D interfaces; and the Saturn-Neptune quadrature cycle is connected to key consumer launches of technologies that have dissolved boundaries in our relationship to space and time. Additionally, we can trace peak technological breakthroughs whenever Jupiter and Uranus are in hard aspect. These correlations speak to the transformative potential of these new immersive communication media, but also to how the outer planetary transits deeply inform our experience and our understanding of it. These connections to outer-planet cycles could indicate that immersive

and ambient computing is progressing down a path similar to that of the Gutenberg press in the fifteenth century.

The Gutenberg press revealed the printed word as a revolutionary communication medium, and we can already see a similar revolutionary trajectory in the way computers have taken root in our era. Starting with the Uranus-Pluto conjunction in the Sixties, when the first commercial systems of mainframe computing were launched, computers have since enabled the Internet, the World Wide Web, personal computing, gaming, mobile computing, immersive and ambient computing, artificial intelligence, the blockchain, the Internet of Things, open source systems, brain-control interfaces, solar energy, drones, and robotics. These exponential technologies may continue to evolve and combine together to create adjacent possibilities that could continue to transform our culture for many years to come.

Just as the printing press led to the Reformation, the Renaissance, and the Enlightenment, it is possible that these new immersive media of VR and AR could catalyze a similar revolution. VR has the power to transform consciousness by providing experiences that directly stimulate our unconscious minds beyond what reading text could ever do. This renewed emphasis on direct experience, in tandem with psychedelic culture, could also prime people to be more open to an archetypal cosmological world view. Just as the power of the Church was challenged by the printing press, it is possible that the worst parts of overly reductionistic science will be challenged through the democratization of direct experience.

We may be moving from the Information Age to the Experiential Age in both our culture and technologies, which are shifting from hoarding data to having experiences. Because our perceptions may soon be able to be hacked by synthetic input that feels just as real as the "real" world, then the lines of objectivity and subjectivity are not so clear. Virtual reality's strong correlations to Saturn and Neptune indicate that our boundaries around what is real and what is fantasy will continue to be blurred as we realize how much the construction of reality is based upon our perceptual input, but also upon our world view and conceptual premises. Going into different virtual worlds with different metaphysical rules may help one navigate between multiple ontologies, and have a higher tolerance for paradox.

There are many potential utopian and dystopian scenarios for how these immersive computing technologies will ultimately impact our society in the future. For my part, I hope that virtual reality can help us become more connected to ourselves, to each other, and to the cosmos. If we are able to become more present within virtual experiences, then perhaps this technology will help us become more present within our daily lives. The future of computing is going to be much more immersive and interactive, and so may we use it to discover our unique gifts, connect with one another, and help make the world a better place.


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