



Are premium small formats in cinema's future? Film-maker Douglas Trumbull has a compact, immersive vision for the future, as Mark Trompeteler discovers

At the Digital Television Summit organised by the Digital Television Group and held in London in 2015 a fairly obvious but simple point was made by one contributor to the conference, Ron Martin, vice president/director of the Panasonic Hollywood Lab. During his presentation he said that the whole point of manufacturers and image technologists constantly forging forward the boundaries of resolution, detail,

dynamic range, colour gamut and pushing image quality from 2k to 4k and possibly 8K is to make the image and its viewing so good that the “window” of the screen will effectively disappear. The viewing experience will be so totally convincing that “the fourth wall” of the cinema screen, or the TV, will essentially disappear to the audience. They will eventually lose the sense that they are watching an image on a screen at both conscious and sub-conscious levels and will feel they are experiencing a kind of reality. You get a similar sensation when

the curtain in a theatre opens and “the fourth wall” is demolished. You are then immersed in a convincing kind of reality. I can only identify two occasions in my life of cinematic and audio visual experiences when I completely lost the sense I was watching a projected image. Somehow it had disappeared and I was experiencing a kind of reality. The renowned cinematographer, director, cinema engineer, technologist, and VFX expert Douglas Trumbull was the man responsible for both. →

ENTER DOUGLAS TRUMBULL

Back in 1991 or 1992, on a theme park ride — “Back to the Future” — I climbed into a DeLorean with my children and “took it for a drive”. During that short ride, I became really scared and thought the car and us, its occupants, were all close to complete disaster and death. Although a sane, responsible adult I actually screamed my head off in front of complete strangers, much to the eternal embarrassment of my children. All my senses were fooled by various technical devices and I lost any notion that I was seeing projected images.

The second occasion was when, as part of the 2015 Widescreen Weekend in Bradford, I saw Trumbull’s short film *UFOTOG*, shot in 4K, 120fps and 3D. While the luminance levels of the projection set up did not do his 3D film full justice and the subject of his film tended to be a little dark, what he showed us was impressive. I was stunned by the clarity and realism that the 120fps rate added to the visual experience. The clarity of the image and absence of any image artefacts made me lose any consciousness of the fact that I was looking at an image on a screen — it appeared as if the actor was looking directly at me through an open space. I was looking directly back at him and no screen surface separated us. I think the lighting, lens used and composition all augmented the effect. The effect on a screen that would totally fill my field of vision would be remarkable.

**VR BATTLE LINES ARE BEING DRAWN**

From the moment people screamed and took cover as they watched one of the first Lumière films of a train entering a station with the locomotive coming straight at them, cinema has always been a form of virtual reality. Today, with the imminent availability of affordable virtual reality headsets, 4K television sets that the likes of the BBC’s R&D unit say we should be sitting very much closer to in order to encompass our field of vision, and with Japanese broadcast researchers who say we

will need to do so even more with the advent of 8K televisions, there has never been greater pressure on cinema to provide a convincing virtual reality experience.

The accepted wisdom and “on trend” response to all of this is Premium Large Format cinema. Douglas Trumbull’s thesis, however, is that a more effective, convincing and cost conscious alternative to PLF is very much worth considering. All that needs to be done is to use existing cinema technology in a different way. A fortuitous, congenial chance meeting in a Bradford

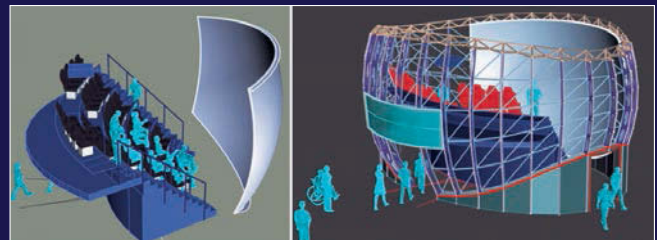
ENTER INTO THE MAGI POD...

The Magi Pod (right) is Douglas Trumbull’s concept for “Premium Small Format” cinemas. Using existing projection technology and smaller auditoria, the goal is to provide a superior immersive experience at a lower operational cost:

MARK TROMPETELER (MT): One of the first things you learn about projection is called something like “the inverse square law” — the closer you bring the projector to the screen the brighter you can get the image? In your concept of the small pod cinema, you could achieve very bright images on a highly reflective surface, with comfortable 3D viewing, by virtue of the pod’s dimensions being smaller than conventional auditoria.

DOUGLAS TRUMBULL (DT): Exactly. You can do a simple calculation around, say, a small IMAX auditorium — for instance of 100ft x 100ft x 50ft with, say, 300 seats. It has a big cubic capacity as it has big roof span of about 100ft. If you take the dimensions of the pod you soon realise you can get more people in pods into the cubic capacity of the auditorium. They will have a better, more pleasurable experience for a lower cost than fitting out the conventional IMAX auditorium.

MT: At IBC:Amsterdam last year, it was the very first time I had really put on any virtual reality headsets and gave them serious consideration. Like everyone, I understand what VR is about but was disappointed with the quality of the images the headsets



delivered. What strikes me about your pod cinema concept, that you have built and demonstrated, is how it resembles a large VR headset in which, say, an audience of up to 60 people can sit. The VR headset is such a solitary viewing experience. In your pod you deliver a communal experience — which is what makes cinema cinema. I love the idea that a couple, group of friends, or a family can be in a pod and as a group enjoy a cinematic VR experience communally.

JULIA TRUMBULL (JT): The pod retains the nature of cinema in as much as it retains the audience’s social relationships.

DT: Also I started realising that theatres are boxes consisting of flat walls, flat ceilings, flat screens — boring boxes. The pod consists of curvilinear lines and walls. The screen itself started to define the space. We asked why don’t we build the building in the shape of the screen and carry it on behind? This egg shape emerged that gives the maximum use of space and the maximum entertainment per square foot imaginable.



hotel bar with Douglas and his wife Julia, led to a subsequent discussion of the issues:

MARK TROMPETELER (MT): In London recently cinemas have been showing *The Walk* and *Everest* in 3D IMAX with immersive sound systems. I wonder what your take is on cinema's trend towards Premium Large Format (PLF) auditoria and these large "tentpole" movies. Is cinema going in the right direction?

DOUGLAS TRUMBULL (DT): I don't think so at all. The whole mission of my life, the trajectory of my career within cinema, started with "2001: A Space Odyssey". Working with Stanley Kubrick, I found myself alongside a brilliant genius who paid extremely close attention to every aspect of the movie, right

▲ Douglas Trumbull's goal is to bring cost-effective immersive experiences to the cinema industry

lack of interest at the studios in ensuring a truly high-quality product got to the theatre that I stopped directing altogether. I had to regroup, leave Hollywood, set up shop elsewhere and redefine what was possible.

I'm trying to make a long story short — but the story is reaching its conclusion because I have really been researching digital photography, digital post-production and digital exhibition as one continuous chain. So the movie is not separated from the way it is going to be displayed.

I feel there is a huge human craving for experiential entertainment that is undefined. It is like virtual reality, in the sense that when people think of virtual reality, they think of some alternative

"THE ABYSMAL TRUTH IS THAT THE SITUATION IN MOVIE THEATRES IS POOR. SHOWMANSHIP IS GONE. THE GIANT SCREEN IS GONE"

down to the details of the print that would go to the theatre. He even considered the focal qualities of the lens in the theatre and the steadiness of the gate. He saw the entire process. That has stuck with me ever since.

The abysmal truth is that the situation in movie theatres is poor. Showmanship has gone. Mostly, the giant screen has gone, 70mm has gone. There is a disconnect between the creative process of making the movie from the way it is shown. They are now two completely separate industries. In a sense, *Cinema Technology* is talking to one industry, and 99.999% of those who actually make movies are not going to read this magazine. They don't concern themselves with exhibition issues — I do.

I came to a point in my career at which I became so utterly frustrated at the complete

experiential out-of-body experience, a dream state or a drugged state that somehow could be life-enhancing and powerful. I think they crave it, but they are not getting it.

WHEN TELEVISION TERRIFIED CINEMA

MT: Don't you think that PLF auditoria in mainstream multiplexes offer that?

DT: They do in the sense that there is a recognition that a more spectacular presentation is desirable and achieves a premium ticket price. It can be more profitable for them. Upgrading to a bigger screen, brighter projection, more comfortable seats and any number of things that patrons can have at their disposal is probably a good thing by its nature.

A LIFE IN FILM

Douglas Trumbull worked on the classic 70mm film *2001: A Space Odyssey* — he contributed significantly in the area of visual effects and made a memorable contribution in the development of the slit-scan photography process used in the "stargate" sequence. He went on to contribute effects to *The Andromeda Strain*, *Close Encounters of the Third Kind*, *Star Trek: The Motion Picture* and, in 1981, on Ridley Scott's *Blade Runner*.

Trumbull developed his patented Showscan process, a high-speed, large-format movie 70mm process shooting and projecting at 60 fps that provided an unprecedented visual clarity in the movies. He directed the classic cult film *Silent Running* and the film *Brainstorm*. Redirecting his career away from Hollywood he concentrated instead on developing new technology for movie production, and for the exhibition industry and theme-park rides, such as the "Back to the Future Ride" at Universal Studios. In 1994 Trumbull was briefly a vice chairman of IMAX Corporation. He contributed to special effects work on Terrence Malick's 2011 film *The Tree of Life*. Most recently Trumbull has been working on his patented MAGI process which he says "goes way beyond anything that Peter Jackson and James Cameron have been doing". Nominated for Academy Awards on five occasions, he has received the American Society of Cinematographer's Lifetime Achievement Award.)

Nevertheless, I am coming up against this real unexpected discovery. It goes back to post-*2001*, when I became disillusioned that the giant screen cinemas were carved up into multiplexes and the giant screens had gone, 70mm had gone, and we were just back to 35mm. At the same time, back at the studios, at production level it was becoming simultaneously movies and television. There was a time in the 1950s, when Cinerama, ToddAO, Vistavision and D150 were all emerging because studios were terrified television was going to take their customers away. It was an understandable fear.

The studios actually became happy campers because they ended up becoming television producers. A large proportion of production at the studios was for television and they joined the enemy. That was what helped develop a common format that would suit both cinema and television, which is what has now developed into 2K at 24 fps — the world standard medium. This →



▲ The curved cinemas of the past (above) — a concept reflected in the Magi Pod system. (Right), 2001 as seen from the the projection box

means that, even if you have a bigger screen, you still only have a 2K image and you still only have 24 fps.

I have come to this new revelation — and this is part of what Julia and I have been doing at our studio, we have been experimenting with an entirely new way to go, namely 3D, 4K and 120 fps.

The first concern has been, legitimately, that if 48 fps creates a movement towards a televisual look, a sitcom, soap opera look, then 60 fps is going to be worse and 120 fps objectionably bad. That is a convoluting thought that is forthcoming from the studios. They are upset at the thought of anything that might rock their paradigm.

What we have discovered is this new alternating frame 3D system at 120 fps. It is

DT: We have to remember that the whole history of the movies since their inception has been to create immersions by some means. The intention from film-makers has been there all along ever since that first movie of the train coming into the station. My philosophy is that if you accept the motion picture medium as it has been all of our lives at 24 fps — usually at double flash, sometimes triple flash — that creates a two dimensional texture in which the movie remains at the screen and is not entering the room, it is staying where it belongs. It is an envelope within which the story is told, directed, scripted and acted — you are telling a story. As soon as you detract from that convention to try and create an experience that is more visceral,

“KUBRICK KEPT STRIPPING OUT DIALOGUE — AND HE LET THE AUDIENCE FEEL LIKE THEY WERE BECOMING THE CHARACTER”

extremely elegant. It is extremely easy to do and doesn't look like television at all.

3D TOWARDS VIRTUAL REALITY

MT: With immersive experiences, you don't use the old words of television as being “a window on the world”, but instead have used a term to define your experiments as striving to achieve “a window through into reality”. So, like others, are you pursuing “The Holy Grail” of cinema technology — of breaking down that “fourth wall” of the screen in the cinema completely?

more immersive and more involving, by adding 3D or adding 70mm and adding a bigger screen, you are, in fact, creating a different medium. Kubrick recognised this and I learned it working with him — there is a whole other world of potential within immersive experiences.

Technologically, once you create immersion, you tell the story differently. There is a different balancing of forces. You use less dialogue and more visuals — and that is a mysterious formula. In 2001 Kubrick kept stripping out dialogue,

stripping out over-the-shoulder shots, stripping out reverse-angle shots, and he let the audience feel like they were becoming the character. There is something like a whole 17-minute uninterrupted sequence of pure point-of-view, during which there is no story, no plot, no drama, no dialogue. Just a visual trip. Fortunately, it was at time in modern history when a trip could be considered a good thing. That profoundly affected me, so when the multiplexes arrived, I was disappointed that the approach we were only beginning to explore was being cut off. Since then, it has been my mission to see how we can get back. How can I get back to that art form and go further with it? Surprisingly, it has a lot to do with 3D technology. I was never a fan of 3D, but as we started to experiment we discovered that we could do 3D so perfectly that the screen surface is virtually gone — you are looking through a window into reality. It is like a live drama unfolding before your eyes. When you look at something stereoscopically you ask the audience to converge their vision onto distant objects, but you also ask them to focus on the screen surface at the same time. You ask them to decouple the muscles in their eyes, this is what causes eye strain. We do not decouple the muscles in our eyes naturally. I began to realise that small screens are in fact better. It is all about field of view, not about scale.

When you present a wide field of view, but not at such a distance and scale, you are not demanding such a strenuous muscle decoupling in the eyes — the 3D viewing can become very pleasurable. Also, if you can make the 3D image brighter, your eyes default down to a more normal exposure, it increases the eyes' depth of field and this increases eye comfort further. This has led me to this amazing concept that multiplexes can, in fact, be a good idea and not bad, and that a giant screen may not be desirable.

We have constructed a much smaller idea of a cinema with screens of up to 35 feet wide — not very big screens. One of the constituents of the screen is the Torus material which is highly reflective. It is also deeply curved, like Cinerama was, but the key is how highly reflective it is. There is no cross reflectance, it does not need to be louvered, and it does not require a million dollar laser illuminator to make it work. You can do it with conventional off-the-shelf equipment. Lasers are obviously coming, but the scale of this is really comfortable and fits in well with the smaller kind of multiplex size theatres. **CT**

Find out more about the work of Trumbull Studios at www.douglastrumbull.com With thanks to Douglas and Julia Trumbull, and the National Media Museum Press Office.