HYPEROBJECT: HOMELAND

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Abstract

This paper describes the conceptual underpinning, theoretical context and workflow of a haptic drawing hologram project, *Hyperobject: Homeland* which proposes that one's homeland is emergent as life experience. The social context of this project is the current extensive use of holographic maps in tactical battle visualisation by the military. The *Hyperobject: Homeland* project proposes a shift in our perception of what a homeland might be in the age of the hyperobject. By inviting viewers to take up the same military point of view above a hologram it allows contemplation of a visualisation of homeland as a type of 'common'.

Keywords: Hologram, Drawing.

The *Hyperobject: Homeland* project investigates the re-purposing of state-of-the-art holographic imaging technology currently deployed in high-level military pre-visualisation of battle sites, as a *theatre* for engaging with compassionate heuristics of homeland. It does so by examining the potential of subjective hand-made drawings of lifelines to evoke empathy when experienced though the fluency in scalability, orientation and resolution of digital holographic imagery. The content of these holographic images are made using Holoshop software (currently in development by the author in collaboration with the Holoshop research group). Holoshop software, interfaced with haptic devices such as the Phantom Premium 1.5, enables sensitive modulation of line drawing in three-dimensional space, which can be exported as a CG scene for a digital hologram. By using a 3D mesh made from the cast of a human palm as a haptic guide, line drawings are made in Holoshop by feeling along the lifeline "terrain". The virtual encounter between the artist and the subject via this haptic gesture is recorded as a three-dimensional lifeline in a holographic image. This process materialises the poignant act of drawing a virtual place in space which can house people separated by political divisions, as proposed in the final lines of Anna Akhmatova's poem *We Don't Know How To Say Goodbye.*

We don't know how to say goodbye:
we wander on, shoulder to shoulder.

Already the sun is going down;
you're moody, I am your shadow.

Let's step inside a church and watch
baptisms, marriages, masses for the dead.

Why are we different from the rest?
Outdoors again, each of us turns his head.

Or else let's sit in the graveyard
on the trampled snow, sighing to each other.

That stick in your hand is tracing places
in which we shall always be together.

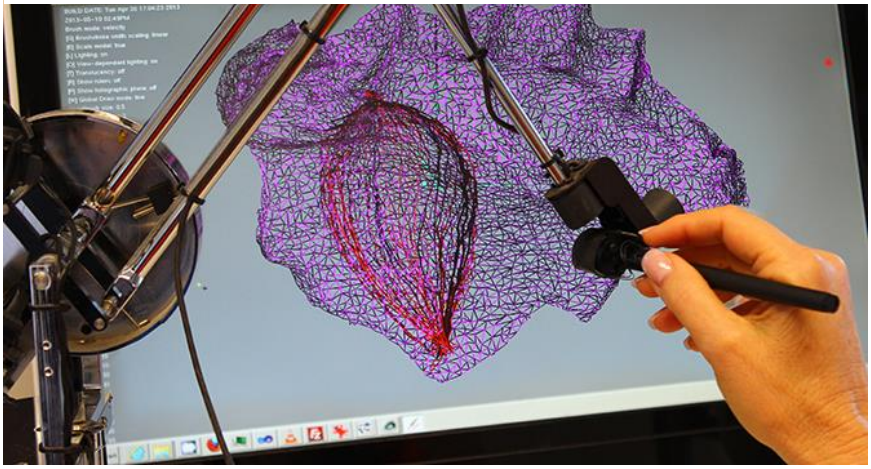
By inscribing holographic space with the poetry of this gesture, a new model of homeland, devoid of terrestrial territory but redolent with human experience, becomes conceptually, spatially and temporally existent.

Background

The US military has witnessed a rapid uptake of holographic three-dimensional mapping technologies in the last decade as a pre-visualisation strategy for enabling situational awareness of 'theatres of battle'. The widespread military adoption of holographic mapping technologies has facilitated attendant revolutionary advances in these technologies. The synthesis of telemetric LIDAR geospatial data with photographic and other contextual site information has enabled the production of high-resolution three-dimensional representations of complex terrains and combat environments in physical holographic maps called Tactical Digital Holograms [1]. TDH of military sites of interest are now readily available to US military personnel and this technology is effectively and fundamentally changing the contemporary application of battle visualisation and operational planning [2].

So far about 12,000 synthetic holographic images combining army-classified and unclassified data have been made for soldiers in Iraq and Afghanistan. These maps are capable of providing multiple viewers with a visual representation in *full* parallax, so that the image appears three-dimensional from all points of view. In this way, TDH are able to perform as idiosyncratic models of 'situation room' scenarios and provide a physical domain for the visualisation and heuristic strategies of engagement [3]. Small groups of soldiers cluster around these monochrome green holograms on a horizontal rotating turntable with a specially designed grasshopper lighting stand enabling enhanced situational awareness. TDH is a proven military technology for mission planning, strategy and pre-combat rehearsal, and within the *Hyperobject: Homeland* project, it is repurposed to engage viewers within an ecology of contemplation of homeland [4].

Fig. 1…. using Holoshop and the Phantom Premium 1.5 haptic interface to draw a lineform from repeated tracings along the lifeline of a human palm. © Paula Dawson



Orientation of Imagery

The radical developments in holographic mapping technology have been driven by what Weizman [5] describes as a vertical spatial turn of sovereignty and surveillance; that is, the construction of geospatial holographic maps of battle terrains. Along similar lines, Steyerl [6] understands conflict as simultaneous across multiple axes, united through technologies of geospatial stratification:

Vertical sovereignty splits space into stacked horizontal layers, separating not only airspace from ground, but also splitting ground from underground, and airspace into various lay-

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Page numbering begins at 1 at the start of the paper.

ers. Different strata of community are divided from each other on a y-axis, multiplying sites of conflict and violence.

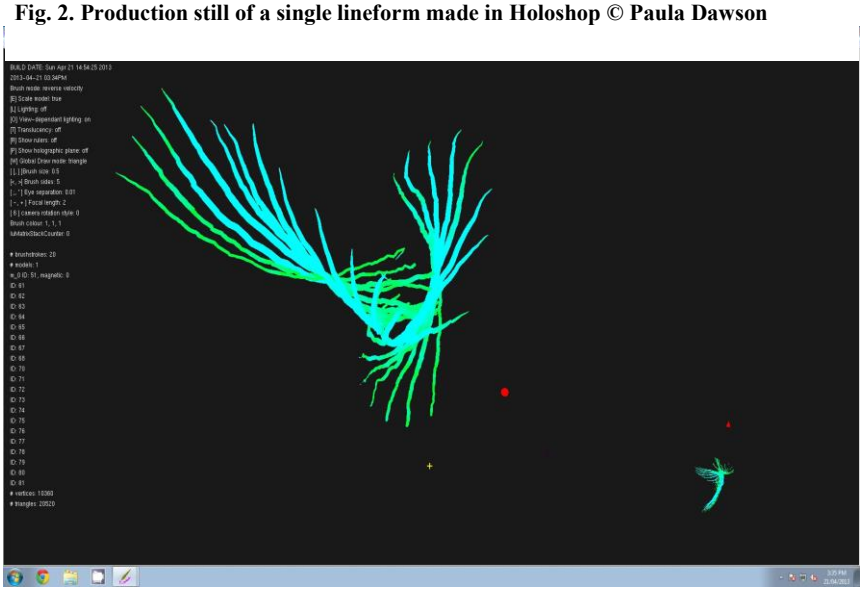
The pervasiveness of military geospatial mapping technologies coincides with obsessive surveillance regimes within entertainment and military industries which seek to displace the 'monocular vision' of linear perspective so predominant in Western thought and action. According to Steyerl, we are now sited in a "visual culture saturated by military and entertainment images, views from above" [7]. New visual paradigms being offered by emergent media shift our spatial and temporal orientation away from a flattened Cartesian plane of the singular and immobile spectator, replacing it with multifocal and nonlinear modes of seeing such as: multiple perspectives, divergent vanishing points, aerial views and distorted lines of sight [8]. Emergent aerial viewpoints exist as a mechanism of "hologrammatization" [9]. The holographic image displaces the perspectival paradigm of spatial representation and visual interpretation, bringing into play a new logic of spatial perception [10].

Scale, Point of View and Hyperobjects

These new representations of space allow for a greater diversification of our internal spatiotemporal thinking. The spatiotemporal disjunction precipitated by holographic technologies has great implications for our capacity to approach what Morton describes as 'ecological thought' – a 'thinking big' that represents a viable thought-path in the time of hyperobjects [11]. Morton describes hyperobjects as inherently contemporary *abstract* phenomena (for example, global warming, radioactive waste) that exist on grossly extended timescales, or are so stretched in terrestrial space as to be unavailable to immediate human experience. In this way, they are able to conceptually undermine normative ideas of time, space, and the 'object'. Furthermore, hyperobjects have emerged *precisely* because of the (ecological, military) crises under which we now operate, and so serve to alert humans to the ecological dilemmas defining the age in which we live. As Morton states, "The ecological crisis makes us aware of how interdependent everything is, and in that interdependence, the fundamental and critical need for care of others" [12].

Images such as the NASA image *Earthrise*, which depicts the earth rising like a miniature sun enveloped by the void, serve to displace our sense of centrality and offer a perspective from the outside [13]. New spatial representations afforded by holographic media (and enabled by aerial points of view) serve to shift our sense of spatial and temporal orientation by removing the ground [14]. The groundlessness of these new visual paradigms resonates with Morton's description of a globalised world of hyperobjects, in which there exists neither horizon background nor foreground against which people and objects can be defined. Rather, what replaces the ground is a vast and intimate mesh: "the interconnectedness of all living and nonliving things" with each point acting as the centre of a system, and its edge. The interconnected mesh "implies a radical intimacy with other beings" [15].

Fig. 2. Production still of a single lineform made in Holoshop © Paula Dawson



Navigation of Holographic Space

Compared to viewing multifocal holographic images, the dominance of normative, subject-oriented perspectives was attended by an expanded importance of linear time. In offering a visual projection forward in space and time, "a view on a calculable future" was provided [16]. According to Morton, this "fixation on place impedes a truly ecological view" [17]. Where normative linear perspectives allow for a 'navigable and predictable' space of calculated risk, the multifocal, de-centred, nonlinear and temporally accelerated perspectives offered by emergent holographic visualisation technologies suggest the possibility of a new paradigm of thought and spatiotemporal navigation [18]. Holographic images potentially allow for embodied experiences, which may allow us to approach abstract concepts and hypotheses. The holographic representational system, when free of the subject matter of specific terrestrial locations, provides an alternative way to visualise space and time. Attunement to affect is amplified in holographic space, which has the capacity to correlate "physiological psychological perception" [19].

Holographic imaging offers a means of visualising hyperobject scale ecology. Zielinski speaks of how the individual has no "access to the world's totality and experiences" but that media interfaces perform the spatiotemporal collapse and visual representation for them [20]. This collapse is nowhere more evident than in holographic space, which represents a shift from an objective, singular centred and linear perspective to multifocal, decentred (ungrounded) and pluri-subjective visions. Media also function as "spaces of action for constructed attempts to connect what is separated" [21]. By collapsing the boundaries between subject and object – and by opening into the mesh of interconnectedness, holographic space approaches a way of knowing defined by Serres as "entering into contact, directly, with things" [22].

This relational contact is carried by, rather than disrupted by the disjunction between the body, the media, and the things (world) it represents [23]. The body serves as the "means of communication" between and among them, such that the body – as a subjective instru-

ment – is always part of the relational equation of representation. As the digital motivates the total mobilisation of perception in temporally based media worlds, new modes of subjectivity are again (or still) required [24].

The decentring of our vision that occurs in holographic space could be interpreted as a precursor to the reshuffling of inherent structures of power, and the creation of "power-free spaces in media worlds" required for sharing [25]. A freeing of the immaterial object from its relations – and in particular, its relationship to violence - may allow for its reformulation as a 'neutral terrain' [26].

Under these conditions is it possible to visualise notions of compassion, hospitality, and care for others. As argued by Levi Bryant, an openness to the other is "an inescapable, ontological feature of the proper being of beings" [27], and begins to address Zielinski's call for social praxis in media worlds to engage a "politics permeated by the poetry of hospitality" [28]. Within this context, Holoshop serves to repurpose [29] military hologram technology, mapping neutral terrain [30] rather than the literal geographic terrain of battlefields.

Workflow

The Holoshop research project develops technologies that interface with the holographic medium. Conscious of military and industrial imaging processes [31]. Holoshop has been developed as a tool that reflects the workflow of contemporary drawing practice.

Over a period of two years, palms of people's hands from diverse cultural backgrounds and age groups were cast in silicone. The same palms which form the terrain of an earlier hologram, *Homeland* were again used in the *Hyperobject: Homeland* project [32]. People were asked to pose their hand as though they were holding a piece of light as silicone was poured into their palms. After twenty minutes an extremely detailed cast was gently peeled from the palm revealing a delicate and organic terrain. The silicone casts of the palms were then photographed and the images were assembled with Agisoft Photosynth into a 3D mesh and oriented so that the lifeline was a concave shape ready for drawing with the Phantom pen using Holoshop software.

Over the past four years several Holoshop software functions have been developed. In respect to line quality, the velocity of the stroke modulates the width of the line e.g. the line becomes wide when the gesture is slow, and narrow when it is fast. Reverse velocity has the opposite effect. In addition, three-dimensional line quality can be ribbon-like or tubular. Other features of importance include magnetic mode, where the haptic pen becomes magnetically attached to the mesh; and pressure mode, where the force of the pen on the virtual mesh surface produces a line of varying width.

However two new Holoshop features were specifically implemented in order to sensitively modulate contour inflections when tracing the path of the lifeline along the 3D mesh and to enable building grouped forms of lines. The first feature enables relative scalability between the visual and the touch aspect of the scene. Independently scalable frusta for touch and vision make it possible to increase the amount of sensitivity to touch so that every minute undulation of a lifeline pathway can be felt.

The second feature, the rotation axis, enables the building of a lineform from an aggregate of lines, one for each year of life, by altering the direction and orientation of the 3D palm mesh. The rotation axis feature enables setting an axis oriented relative to any line drawn in Holoshop. The rotation axis tool has a pre-visualisation function which shows where future lines will be according to alterations of the axis of rotation.

Each of the one hundred and fifty individual lineforms in the hologram were drawn using these unique Holoshop software tools. Some "older" lineforms with up to ninety lines were drawn along four different axes of rotation. This was intended to suggest shifts in focus and orientation experienced over a long lifetime. Spatial structures, some resembling shells and others nests emerged from repeated tracings along the same lifeline.

After each of the one hundred and fifty individual lineforms were drawn in Holoshop, they were exported separately as object files. These object files of the lineforms were in turn imported into Maya and arranged within a cubic volume which would be 1.2 x1.2 x 1.2 meters as a hologram. The distribution of the lineforms in the space ensured that when illuminated, the lineforms that were distant from the hologram plate would be blurred. The free floating placement of the lineforms is intended to evoke the distances between planets in a galaxy. Colours were applied to the lineforms, which resemble the palette of recent images taken from the Hubble telescope as a further suggestion of the ambiguous scale between the line on the palm of the hand and outer space. This fluidity of scale seeks to fragment the indexical relationship between military holographic images and real geographic sites.

The final Maya scene was uploaded to the Zebra Imaging web site where the image was slightly adjusted and viewed as a simulation of the hologram. Zebra Imaging, in Austin Texas, printed the image to four, 60 x 60cm tiles, which were shipped to Australia. The images were exhibited horizontally slightly above the floor level of COFA Space gallery at the College of Fine Arts, UNSW Sydney during ISEA 2013. The digital holograms were illuminated with Source 4 Jr theatrical lights from above centre.

The images of lineforms were altered significantly from their original

Fig. 3. Hyperobject: Homeland (2013), digital holographic print, 120cm x 120cm. © Paula Dawson. Photo © Oliver Strewe

drawing in Holoshop in order to be displayed as a hologram. The perfection of the CG forms were dissolved in a cloud of visual noise created from the high proportion of lineforms that were out of focus. This background noise became a soft cloud-like haze in which the lineforms floated, disintegrating as they came closer to the viewers' hands.

Conclusion

The term Homeland generally implies both inclusion and exclusion. The model of Homeland presented in *Hyperobject: Homeland* is instead entirely inclusive of all beings. This visulisation is made possible though the unique properties of the digital hologram and the representation of six thousand lifelines.

A lifeline is the embodied representation of an entire human life. The virtual interaction with each life happens twice in Hyperobject: Homeland. The first interaction involves the artist tracing along the lifeline and the second involves the viewer also interacting by reaching out to touch the holographic image. The spatial configuration of the line forms, their colour, blur, distortion and immateriality as digital holographic imagery, presents a visualisation of the collective communality inherent in all human life experience as a vast homeland. The space of the hologram encourages groups of people to collectively view and discuss its subject through tactile interaction. A reconceptualisation of Homeland at hyperobject scale is constructed expressing a paradigm of heightened empathy and compassion.

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