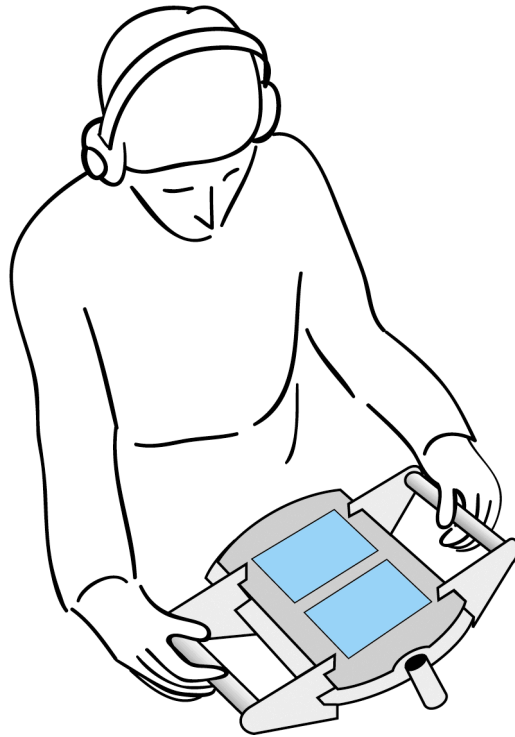


“HandHeld”

*An exploration into
the narrative of
moving image and sound
in a handheld device.*



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MFA Thesis Project

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Project Overview



“HandHeld” is an exploration into the narrative possibilities of moving image and sound with respect to mobile, handheld devices.

The work is realized through a specially built handheld viewing device, designed to engage and stimulate viewer participation and exploration, and to allow application of, and experimentation with, a range of audio/visual hypotheses.

By simply picking up the device, then tilting and pitching left and right, forward and back, the viewer is able initiate a direct response in the imagery displayed on the screens¹. This response is both spatial and temporal, and allows the viewer to create, and participate, in their own audio/visual narrative experience, generated in real-time from both prerecorded material and live input.

The first prototype work consists of two 7-inch TV panels combined with a motion sensor, and mounted in a specially constructed acrylic frame with handles on each side. The work is connected to a computer that manages the output and playback of moving images, and interprets incoming signals from the motion sensor. Sound is also incorporated into the experience, and is available either through headphones or through speakers. The device incorporates a small video camera (aimed at the viewer) enabling the addition of live imagery to the experience.

Through software, motion and orientation data are combined with digital video (and audio) clips, and computer-generated elements to create real-time affects and modifications on the playing narrative(s), all initiated by the simple tilting and pitching of the device in the viewer’s hands.

¹ And the accompanying audio elements.

Conceptual Basis



In a world awash in portable handheld devices, from the PDA to the *PSP*², from the iPod to the (most ubiquitous of all) mobile phone, there is a shift towards a more personalized—perhaps intimate—form of mediated communication, information, entertainment, and interaction. These devices also bear witness to the ongoing miniaturization of the computer—the personal computer becoming ever more personal. While games³ seem to fit naturally into the world of personal handheld devices, few have explored the possibilities for the medium of cinema and moving image.

“HandHeld” challenges the normal assumptions and relationships between the screen (the cinematic space) and the viewer, and begins an artistic exploration into a range of possibilities for narrative moving image in a very tactile, visceral, and 3-dimensional work. The work explores some of the possibilities made available through the use of digital media (and digital technologies) in the areas of time/space, simultaneity and parallelism in narrative forms, particularly cinematic narrative, and how new, 'expanded' audio-visual narratives might be created and experienced.

"HandHeld" also explores the machine-user interface of handheld devices in relation to narrative by introducing a very direct, intuitive form of interaction—the simple tilting of the playback device in the viewer's hands. Currently, most handheld device interaction is carried out through just one form of control: push-buttons.⁴ Portable game players have merely transplanted a traditional arcade game control interface into a smaller package, turning joysticks into small 4-way rocker switches or 4-button clusters. PDAs provide pen-based input and handwriting recognition, but for most users, the pen ends up being a substitute for the click of a mouse.

Of course, these devices have not been designed with narrative moving image in mind, but the conceptual and artistic direction of this project opens up the possibility of exploring other human-machine interface directions, and in turn, further exploring areas of the 'physical grammar' of interactivity and devices/machines that are more 'responsive' in nature, and which may be capable of both conveying and sensing emotion.⁵

² PSP: Sony *PlayStation Portable*: <http://www.us.playstation.com/psp.aspx>

³ “Games” in the commonly understood sense of “computer games” or “video games”.

⁴ This is particularly so with mobile phones, where the traditional nine-button keypad of the telephone has basically just been transplanted into a smaller, more portable unit. Humans now have to battle the nine-button interface in order to control a whole host of functions (like SMS) and tools that are now built into these devices.

⁵ Camille Utterback: *Potent Objects* (2003). <http://www.camilleutterback.com>

Additionally, “HandHeld” challenges normal assumptions about games and game-play in relation to the experience of moving image. The cinematic experience is, by and large, a somewhat passive activity, where the viewer just watches narrative(s) on a screen. The viewer is a passive element—usually just one of a larger audience—allowing a pre-determined narrative to unfold in front of them. “HandHeld”, however, is a very personal narrative experience, one that introduces an element of participation and interaction into the cinematic experience, one that is directly controlled and influenced by the viewer him or herself.

In one sense, the viewer is able to “play” with the narrative, directly influencing their own narrative experience in real time by changing both spatial and temporal aspects of sequences that appear on the screens⁶. In another sense, the addition of live video input allows the possibility of *creating* narratives (or certain aspects of narratives) in real time. Live input can also be extended beyond just live video from a camera on the device itself. It could include live audio, live video from another remote source (e.g. another viewer using another device), or live input from other source types altogether (e.g. temperature of the room, level of light in the room, level of noise in Times Square New York, etc.)

This element of live input, combined with pre-recorded digital material, enables the possibility of very unique narrative experiences: unique to the moment they are created (i.e. they will never be repeated) and unique only to that individual viewer’s experience. This is unlike the normal experience of a video game where, no matter how complex the structure, most game narratives are pre-determined. Taken together, a strong element of discovery and surprise can be introduced into the narrative experience through this work.

⁶ And audio elements, that also change and shift in real time as well.

Theoretical Background

Inspiration and motivation for the project was initiated by two key fundamentals:

1. The possibilities made available through the use of digital media (and digital technologies) when applied to concepts of time/space, simultaneity and parallelism in narrative forms, particularly cinematic narrative;
2. The possibilities and prospects of applying cinematic narrative (or at the very least, some form of moving image narrative) in personal, screen-based handheld devices, such as mobile phones, PDAs (Personal Digital Assistants) and Pocket PCs, and portable game players, etc.

Looking at each of these in turn:

Cinema and Digital Media

While computers and digital technologies continue to advance into almost all aspects of our lives, and almost all “media” is becoming digital in nature⁷, the forms and expressions and ways of receiving/interacting with such media seem to be stuck in the present (or the past); cinema, and especially Hollywood cinema, being a prime example. Today’s cinema swamps us with computer-generated imagery and digital effects, yet the narrative form, the development of characters, situations, and locations remain highly formulaic and often predictable. Even the mode of viewing—seated en-masse in a darkened room looking only at one single (rectangular) spectacle produced by reels of celluloid running through a projector—remains essentially (and doggedly) unchanged since the 1900s.

When it comes to digital technologies, cinema is particularly abnormal in this regard. All elements of the production process are either already digital, or quickly becoming digital. Features are starting to be shot on digital cameras⁸: editing is done on PC-based non-linear digital editing systems⁹: visual special effects and ‘enhancements’ are of course all generated on computer: all music and sound is recorded and mixed digitally: and soon, many theatres themselves will begin screening via digital projection systems. And yet, mainstream cinema remains doggedly entrenched in the same plot, narrative, time/space/mis-en-scène formulas.

Blaming Hollywood may be unfair. It is, after all, an “industry”, run by big companies, trying to make big money by producing an expensive “product” called “entertainment” which is for a “consumer” who has come to expect that product to perform in a certain way. Indeed, when the product doesn’t perform as expected, the consumer can get quite angry¹⁰.

⁷ At least in “material” form, and the way it can be manipulated. E.G. all images becoming a collection of pixels, all audio becoming a sequence of ‘samples’.

⁸ *Star Wars: Episode II - Attack of the Clones* (George Lucas: 2002). *Once Upon a Time in Mexico* (Robert Rodriguez: 2003).

⁹ Most Hollywood editing suites now use Apple’s Final Cut Pro software on Macintosh computers.

¹⁰ See the User Comments for *Time Code* (Mike Figgis: 2000) on <http://www.imdb.com>

But cinema can still be an art form as well. Digital tools give the opportunity to dissect, deconstruct, stretch, push, pull, morph, cinema into new directions. Digital tools give us the opportunity to prod and question the very nature of cinema. Does cinema always have to try to faithfully reproduce reality, even digitally? Bazin may have argued that cinema was *preconceived* as “a total and complete representation of reality...”¹¹ and that still seems to be one of the holy grails of moving image—even on the computer. On the other hand, more than 50 years ago, film critic Rudolf Arnheim wrote:

“[The filmmaker] shows the world not only as it appears objectively, but also subjectively. He create new realities, in which things can be multiplied, turns their movements and actions backward, distorts them, retards or accelerates them... he breaths life into stone and bids it move. Of chaotic and illimitable space he creates pictures... as subjective and complex as painting.”¹²

For the most part, Arnheim was writing about the films of the silent era, when filmmakers were pushing against the boundaries and limitations of the medium—black and white, no sound, heavy cameras—trying to discover and express new artistic forms rather than push for realism. Perhaps such a direction remains appropriate today, given the constraints and limitations of moving image on handheld devices: small screens, limited interface control, limited bandwidth for wireless transmission of content (especially video content). In the digital realm, an interesting case is made *against* the direction of QuickTime “movies” in an essay by Vivian Sobchack¹³, in which she argues for preserving the visual-audio aesthetics created by early QuickTime movies and their compression codecs, creating a unique kind of jagged, pixilated sequence, with muffled, hollow audio. Thanks to recent improvements in codec compressions and bandwidth, QuickTime¹⁴ is now able to play back highly detailed moving images and audio of (usually) trailers of upcoming films, and the early digitally-created limitation aesthetic is rapidly disappearing. Sobchack questions why we try to re-create the cinematic experience on a computer, a device based on “memory”, databases, and hierarchical and hyperlinked file systems. Is a ‘faithful and true’ reproduction of reality the only direction? Could forms of digital motion and animation be inserted, combined, ‘mixed in’ to create other more intriguing narrative expressions? Are we missing something? Is there another way of exploring the potentials and possibilities of cinema—of the moving image, with sound—than creating something that just plays on one screen, in front of you, in a darkened room?

DVDs are one form of digital technology that attempts to bring a degree of interactivity to film narrative. It is sometimes possible to have a richer experience of a movie on DVD than in the traditional theatre setting. Multiple audio tracks offer a number of interesting possibilities, beyond the ubiquitous ‘director’s commentary’, as does 5:1 surround sound. Multiple viewing angles are also interesting, but are rarely used in commercial DVD releases. But in the end, DVDs are just a storage/playback medium.

¹¹ “The Myth of Total Cinema” from *What is Cinema?*: Bazin: 1964

¹² Rudolf Arnheim, *Film As Art* (Berekeley, University of California Press: 1974)

¹³ “Nostalgia for a Digital Object: Regrets on the Quickening of QuickTime” by Vivian Sobchack, PP66-73: *Future Cinema: the Cinematic Imagery After Film* (ed. Geoffrey Shaw: 2003)

¹⁴ QuickTime 7 now supports the H.264 codec, a scalable codec, able to deliver very high quality playback at almost any bandwidth, from web and mobile phone, to DVD and high definition video. <http://www.apple.com/quicktime/>

They have these (perhaps limited) capabilities because they have the capacity to store the digital data required, and a common ‘protocol’ has been agreed on how that data is accessed and displayed.

Simultaneity and Parallelism

Given the abundance of screens that now surround us—not just at the theatre or in the corner of the living room, but on the desktop, in the mall, on the bus, in the street, in our pockets—perhaps we are becoming preconditioned to absorbing multiple simultaneous images. In cinema, few filmmakers have attempted to address the possibilities of simultaneous and parallel narratives. One filmmaker that has is English director Mike Figgis, with the film *Time Code* (2000), where the screen (or frame) is split into 4, and four narratives play out together in real-, synched-time. The movie was shot simultaneously in one take, with each of 4 cameramen (including Figgis) following 4 actors (or sets of actors) who were all participants in the same story set in and around Hollywood. The movie was shot entirely on video, and is 93 minutes long, dictated by the length of the tape available at the time.



Still from Time Code (2000). Dir. Mike Figgis (Columbia Tristar).

At times, we follow 4 different stories on the screen; at other times 2 or more stories (characters) will cross or meet in the same physical space; at other times, a simultaneous event will affect all 4 narratives on screen (Figgis used a simulated Los Angeles earthquake that was timed to occur at precisely the same moment, no matter where the actors and cameramen were). The dialogue from every single actor was recorded throughout the shoot, with each actor wearing a hidden wireless

microphone. Thus, audio and dialogue also created interesting possibilities. At certain times, the audio from one scene is dominant; at other times, the audio from another scene comes to the fore.

Occasionally all scenes compete for our ears. On the DVD version of the movie, the viewer is able to choose which audio from which scene to bring to the front at any moment during the narrative. After the film’s release, Figgis took the movie on the road, doing live audio mixes of the movie while sitting in the middle of the theatre *with* the audience, adjusting the audio/dialogue mix each time depending on the reaction and ‘mood’ of the audience, thereby creating a degree of interactivity with the narrative.

The film, although made for the conventional single cinematic screen, alludes to the possibilities for multiple screen playback/viewing devices. It opens up the opportunity of allowing the viewer to shift

attention at will from one narrative sub-set, or sub-sequence, to another, or to view and experience the interplay between two or more narrative sub-sequences playing at any one time.

This in turn initiated my inquiry into the possibilities of shifting the type of multiple narrative displayed in *Time Code* from one single split-screen format to a format that utilizes multiple screens, although not just as an end in itself, but as part of larger, more interactive experience that gives the viewer a greater sense of participation—and engagement—over the narrative(s) playing out before them. The obvious direction to look was that of personal, handheld devices.

Handheld Device as Narrative Platform

In the handheld device—mobile phone, Pocket PC, PSP—human-machine interaction is already an integral part of their *raison d'être*, and a crucial design element in their functionality is the screen itself. The screen plays a primary role in the interaction process; i.e. the screen is not only used for viewing content and information, it is also used as a medium for interacting with the device, via the GUI. Many devices today use ‘soft’ buttons; buttons located adjacent to the screen whose functionality and actions are changed according to names that come up on the screen, directly adjacent to the buttons. The button’s function or resulting action changes according to what area of the GUI the user is accessing at the time.

However, is this ‘physicality’ of pushing a button—whether a standard button, or a ‘soft’ button—the only way of interacting with a handheld device? What other ways could create an intuitive, more responsive interaction between device (machine) and user? Clearly, one area of focus would be the motion and/or orientation of the device in the user’s/viewer’s hand. The fact that such devices are designed to be portable, and therefore fit easily in the hand, mean there is an intrinsic degree of motion, movement and kinetic change as an inherent part of the relationship. So, could simply moving the device create a direct interaction (and more immediate relationship) between user and machine, between viewer and content?

Taken further, motion of the device in the viewer’s hand could of course be extended to include movement, orientation and location of device and user together in a wider environment. This is where the involvement of multiple viewer-device relationships comes into play, and the social implications for networked device-users open up interesting artistic possibilities. However, much work has already been done in this area, particularly with networked groups of mobile phone users¹⁵, and the initial focus of this project is the personal (one-on-one) relationship between viewer and narrative moving image. Through interactivity, that relationship will certainly include the participation of the viewer in the narrative space, and this could be extended to include multiple participants in multiple, interconnected narrative experiences. But for now, that is a longer-term objective of the project, to be explored in a later phase.

¹⁵ Example: artist group *Blast Theory* (UK), www.blasktheory.co.uk

Affective Devices

Exploring the interplay between moving image and the interactivity possible on a handheld device also allows for an opportunity to move away from the familiar mouse-and-keyboard constraints of the personal computer, or the 9-button keypad of the mobile phone. These interfaces have become so commonplace and ‘taken-for-granted’ that people often find it surprising and engaging when a device responds or provides feedback from some other form of interaction—the simple tilting motion of the device in the viewer’s hand, for instance.

This is something that is being explored at great length by other artists. In particular, Camille Utterback, a US-based new media artist and programmer whose work explores and examines various “physical-digital interfaces—ranging from the familiar mouse and keyboard to more unusual sensing systems—(that) provide the connective tissue between our bodies and the codes represented in our machines... (such) interactive systems determine the *grammar* of our interaction with digital media, and ultimately its possibility for meaning.”¹⁶

In particular, Utterback’s 2003 work, *Potent Objects*, presents some interesting parallels with respect to simple narrative in a very personal, handheld device. Her focus with *Potent Objects* was to:

“...playfully examine the way we ascribe emotion to inanimate technologies. *Potent Objects* parallels current research in ‘affective computing,’ in which the capability of sensing and conveying emotion is built into computing devices. The work suggests that, though our machines may seem to be becoming more like us, the truth could be just the opposite. *Potent Objects* examines the tropes of interactivity as metaphors for human emotion.”¹⁷

The concept of ‘affective computing’, which involves giving machines the skills of emotional intelligence, including the ability to recognize, model, and understand human emotion, also forms part of the background exploration of “HandHeld” and will be integral to the future direction of the work.¹⁸

¹⁶ Artist’s statement: www.camillutterback.com/statement.html

¹⁷ Artist’s project description: <http://www.camillutterback.com>

¹⁸ Example: MIT Media Lab’s Affective Computing Group. <http://affect.media.mit.edu>

The Prototype Device



Basic Components: 2 7-inch TV panels and an old PC game controller.

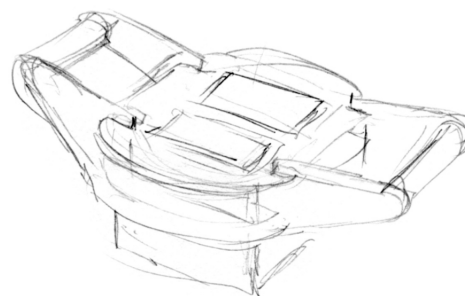
the-shelf units normally sold as wall-mounted TVs for small spaces, shops, or for in-car entertainment systems. The motion sensor comes from an old PC game controller that contains a motion-sensing chip. Other buttons and controls from the game controller have been retained for possible future applications in the device.

The prototype device is connected to a computer that manages the output and playback of moving images, and interprets incoming signals from the motion sensor. The computer contains additional video output cards in order to ‘drive’ (deliver images to) the TV panels. Stereo sound is also incorporated into the experience, and is available either through headphones or through speakers.



The handles of the game controller are removed and the controller mounted in an acrylic box. Most of the buttons on the controller are retained for possible future applications.

In order to begin this exploration into narrative moving image on a handheld device, I have designed and built a prototype device as a test-bed to explore different content options, narrative scenarios and interactive relationships. The prototype device is an integral part of the work as an artistic piece, and consists of two 7-inch TV panels combined with a motion sensor, both mounted in a specially constructed acrylic frame with handles on each side. The TV panels are standard off-



Early concept sketch of the prototype device.

The device also incorporates a small web-camera video camera at the top (aimed at the viewer) enabling the addition of live imagery to the experience.

An Apple Macintosh G4 desktop computer is used to run the playback software that manages the output and playback of moving images to the device, and software that interprets signals from the device motion sensor. It was found that the Macintosh

platform was able to easily support multiple video cards (outputs) with little or no system or software configuration: just the installation of additional video cards into available PCI slots. The default video-out port is used to connect a conventional monitor, via which software configuration and adjustment can be carried out.



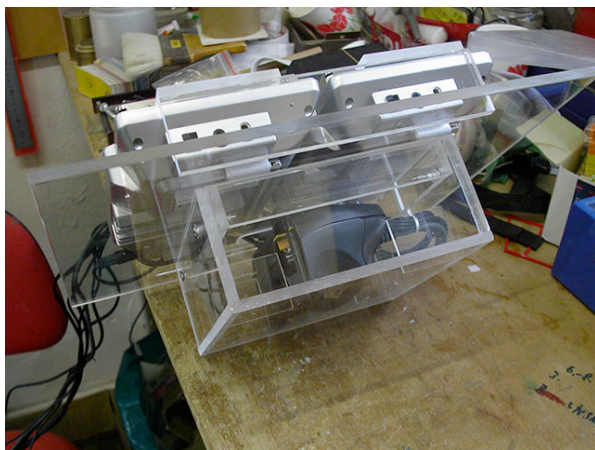
The TV panels mounted together in an acrylic frame....

Two additional *ATI Radeon* video cards are installed in two of the PCI slots, connecting to the TV panels via s-video cables. Up to 4 video cards could be installed in the computer, potentially supporting a device with 4 screens.

The software used to configure, manage and playback images to the screens is *Isadora*¹⁹, a graphic programming environment that provides real-time interactive control over digital media, with special emphasis on the

real-time manipulation of digital video. *Isadora* uses a modular, “building block” approach that allows for rapid experimentation and manipulation of video-image, still-image, and audio content. *Isadora* also supports output to four separate screens, allowing for considerable freedom in experimenting with multiple parallel and simultaneous narratives. *Isadora*’s emphasis lies with the real-time manipulation and playback of video content, rather than computer-generated content. This puts some limitations on

experimenting with the generative possibilities of the computer, because (unless it is live video input) video is by nature a prerecorded medium. However, modules can be written for *Isadora*, and the software supports *FreeFrame*²⁰, an evolving, open-source standard for video-processing plugins.



...with the game controller underneath.

Isadora can manipulate and affect video in real-time via a number of input modules, most of which work by reading incoming

MIDI signals. In order to convert the motion sensor output from the game controller to an appropriate MIDI signal, *JunXion v1.4*²¹ is used. *JunXion* is able to connect and route any USB input device such as a joystick, game pad, or mouse, to MIDI controlled music/sound software. It is run in conjunction with *Isadora*, and before *Isadora* starts up.

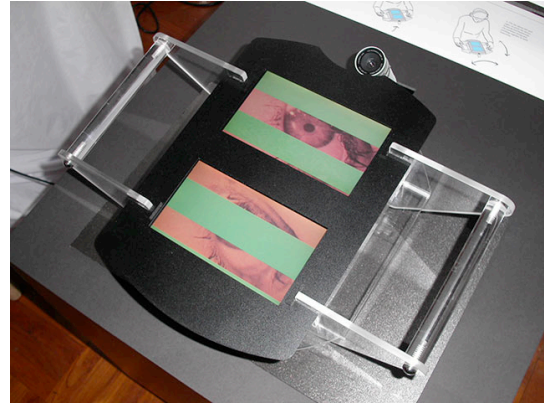
¹⁹ Troika Tronix live performance tools: <http://www.troikatronix.com>

²⁰ <http://freeframe.sourceforge.net>

²¹ Steim: <http://www.steim.org>



The device connected to the controlling computer in early testing.



The finished prototype of “HandHeld”, with handgrips added each side, a black surround over the screens, and mounted video camera.

Isadora has been used to create a number of different scenes, or sequence sets, which can be manipulated or acted upon by reading and implementing affects from the motion of the device in the X and Y planes; left and right, forward and back. This allows the user/viewer to experiment and play with different tilting/pitching combinations, creating different experiences depending on how they angle the device. A tilt ‘trigger’ was also set up in *Isadora*, whereby tilting the device hard over to the right causes the software to load and play the next scene (sequence set).

Content on the Prototype Device

An early *content* work of experimentation with the device is entitled “Psycho Repsycho”, in which the famous shower scene from Hitchcock’s movie *Psycho* has been deconstructed into its constituent elements (individual edits as separate QuickTime movies), and is then reassembled onto the device screens in real time. The shower scene was chosen in order to experiment with what is a traditional, very well known piece of cinematic narrative, and to see how such a familiar scene could be ‘re-experienced’ in this new medium. In addition, Hitchcock’s use of fast, short cuts, rapid close-ups and jarring sounds, allows for greater deconstruction of the scene, whereby each shot can be captured and “cut” into a separate digital element—a shot becomes a separate QuickTime movie. In *Isadora*, these “shots” can be loaded, played, looped, reversed and manipulated dynamically in real time, forever changing the original narrative tempo, order, and intention of the director and editor. In a sense, the viewer becomes director and editor.

Four different sequence sets have been created for this work: the viewer can ‘cycle’ from one sequence set to the next simply by flipping the device over to the right. Each sequence set produces a different “mix”, or experience, of the shower scene, often using multiple video (and audio) clips that load in different orders, play at different speeds, or change position and size, all in relation to tilting and pitching of the device in the viewer’s hands. All sequence sets output different spatial-temporal

combinations to each of the two screens on the device, creating a variety of different intra-screen narrative experiences.



The first sequence set uses a split-screen technique, in which shots from the shower scene are split into four frames (similar to *Time Code*), with an additional central frame that appears to ‘float’ above the other frames. In the upper screen, the floating frame moves diagonally across the screen according to tilting of the device by the viewer. In the lower screen, the floating frame zooms in and out (grows larger or smaller) according to tilting of the device.

In addition, tilting left or right causes different clips (edits) of the movie to load and loop in real time. Different audio clips from the soundtrack (the woman’s scream, the shrieking violins, the sound of the shower) also load and loop according to how and where the viewer tilts the device. Pitching the device backwards and forwards also changes the colour tint of the background shots, affecting the overall atmosphere of the sequence on screen.



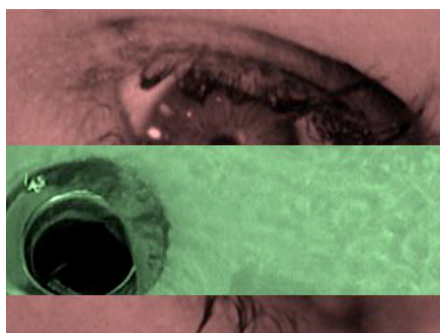
The second sequence set experiments with the mixing of computer-generated imagery with pre-recorded video imagery. Clips from the shower scene clearly showing the murder weapon (the dagger) are selected and played back on the screens. Over these extends a dagger-like line that moves, grows, and changes colour according to tilting and pitching of the device in the viewer’s hands. Here, real-time and very responsive computer-generated imagery is

combined with video material to experiment with endowing the viewer with a sense of control over the scene (or an element in the scene). The computer-generated images are sufficiently abstract but can be interpreted by the viewer in a number of ways. Another dagger entering the scene? The viewer attacking the victim? or a weapon that is defending the victim?



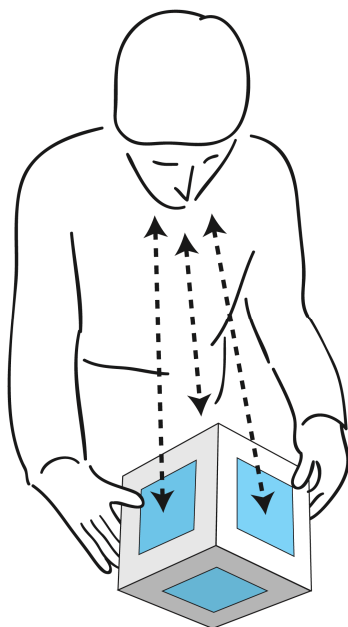
A third sequence set combines live video input from the small camera mounted on the device. The camera is pointed upwards towards the viewer’s face. The floating frame that appeared in the upper screen of the first sequence set now contains the live image of the viewer coming in from the camera. The lower screen’s floating frame (the one that zooms in and out) contains shots from the shower scene, but pitching the device upwards causes a

frame of live video to be captured and inserted into this frame playing on the lower screen, allowing the viewer to momentarily become part of the scene itself.



Finally, a fourth sequence set takes the two last long shots of the shower scene and combines them together. After the killer leaves the bathroom and the victim slumps over, Hitchcock gives us a long slow pan down the victim's legs, following the water into the drain of the bath. This slowly dissolves into a long shot of the victim's eye, as the camera pulls back and rotates. Each of these long shots is split horizontally, in an 'interlaced' effect, and each is colour tinted a differently. By tilting and pitching, the viewer is able to 'mix' the two shots together in real time, creating their own experience of the final shots. The effect is to bring one shot to the fore while pushing the other back, and vice-versa. In addition, tilting to the left increases the sound of the shower water in the bath (the drain comes into the shot from the left), while tilting to the right reduces the water sound and increases other audio elements.

Future Developments



“HandHeld” forms the beginning of a larger inquiry into the nature of the relationship between the viewer/user and handheld, screen-based devices, both at an individual level (through the ‘physical grammar’ of interactivity and ‘responsive’ devices—see *Potent Objects* above), and at a more networked (social) level. Additional devices will be developed that incorporate up to four—or possibly six—screens, and that incorporate a greater variety of live input sensors and sources.

One possible configuration for a device is that of a cube, where each face of the cube has its own screen, and where the cube is held in the hands and turned in any direction. One interesting effect of this format is going to the fact that, even though the viewer *knows* the device contains six screens, they can only *see* three screens at any one time.

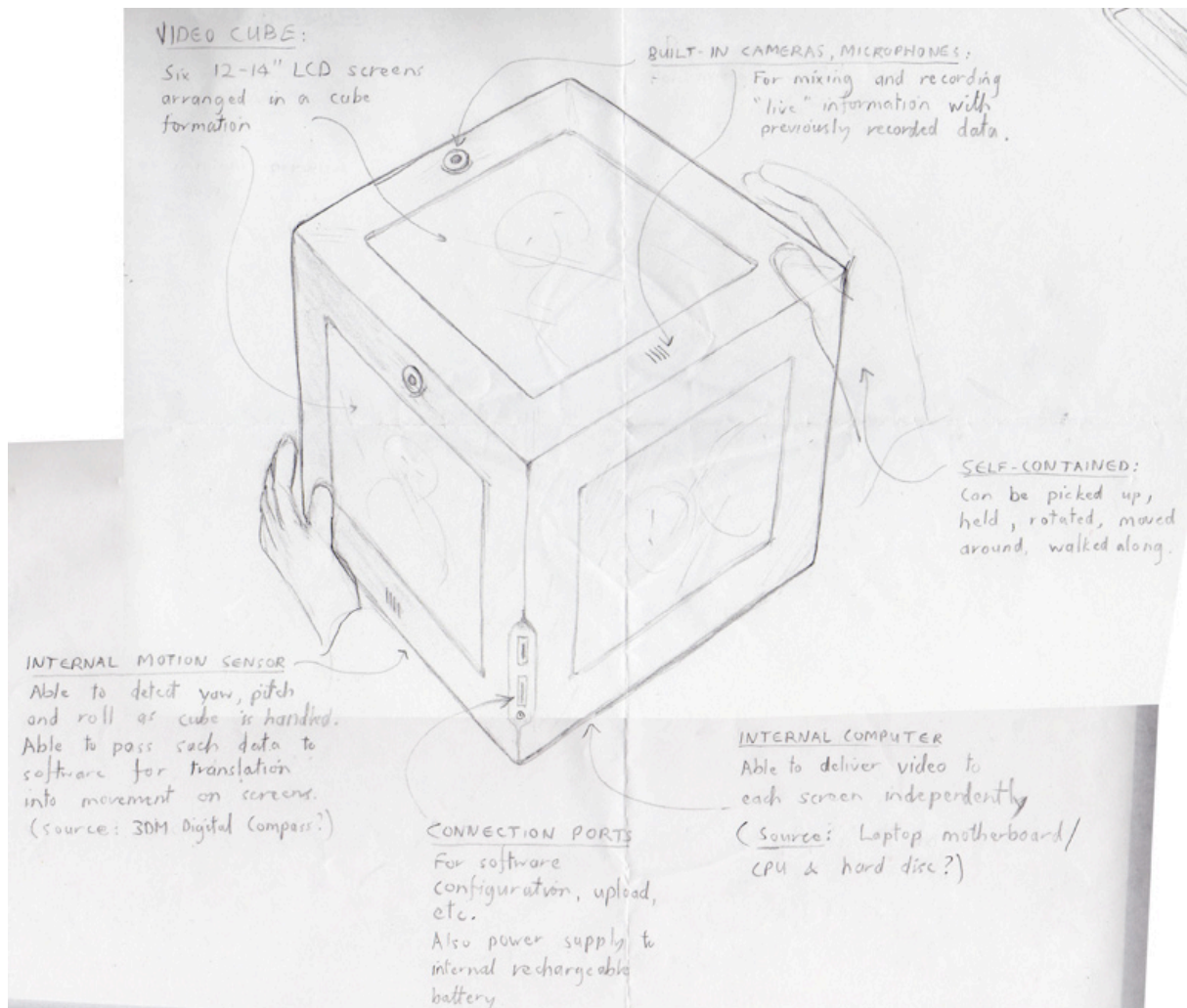
An new, upcoming version of *Isadora*²² will be able to support independent output to six screens (currently the maximum is four), and will support serial interface input in addition to MIDI, allowing input from a much wider variety of sources, such as sensors that detect light, movement, heat, and so on.

²² Version 1.1 of *Isadora*, expected to be released before the end of 2005.

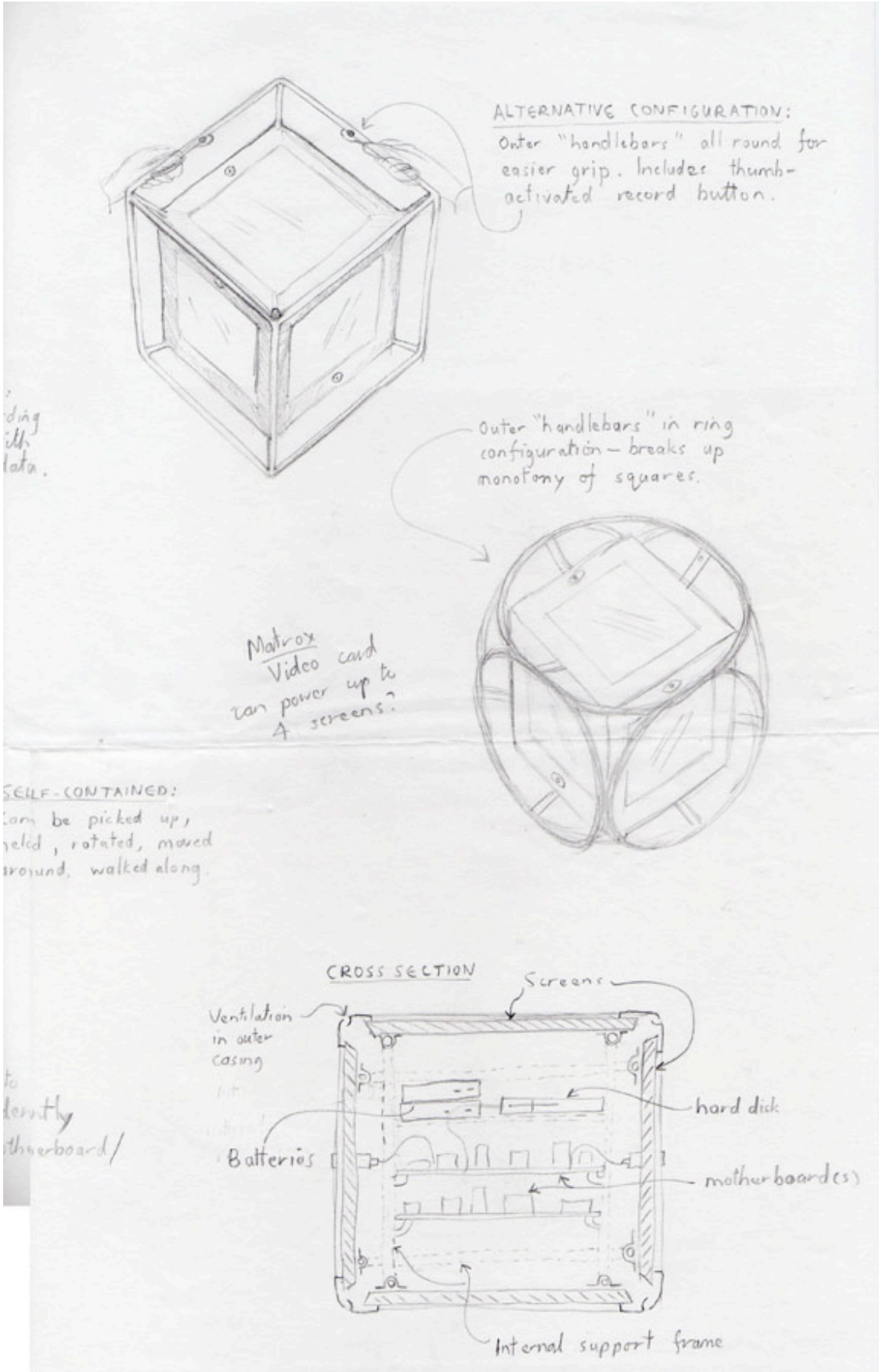
New audio/visual content will also be created to explore the new narrative possibilities with the medium, and later on, further work will be conducted into networking “HandHeld” devices together to explore the potential of shared or “cooperatively created” narrative experiences.

Appendix 1: Early Device Concept Sketches

Early sketches for a cube-like handheld device with square screens on all six sides, and built in video cameras.



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Appendix 2: References

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Note: QuickTime video clips of “HandHeld” in action, along with additional photos, are available online at <http://www.nickfoxall.com/handheld/>

Appendix 3: Artist Biography and Background

Nick Foxall is a successful multimedia artist and designer, living and working in Hong Kong. Originally from the UK, Nick’s multi-disciplinary background and extensive experience have given him the opportunity to work on a variety of creative media projects, from corporate brand design campaigns, to web sites, videos and interactive multimedia projects.

Nick’s current interests lie in video and film, where he is developing a number of projects. In April 2004, his work “Adventure Under Sail”—a 30-minute documentary profile of adventurer Marc Cuthbert—was awarded First Prize (Documentary) at the Beijing International Student Film Festival.

This paper is part of the work “HandHeld”, Nick’s final year thesis for a Master of Fine Arts Degree in Media Design & Technology at the School of Creative Media, City University of Hong Kong.

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