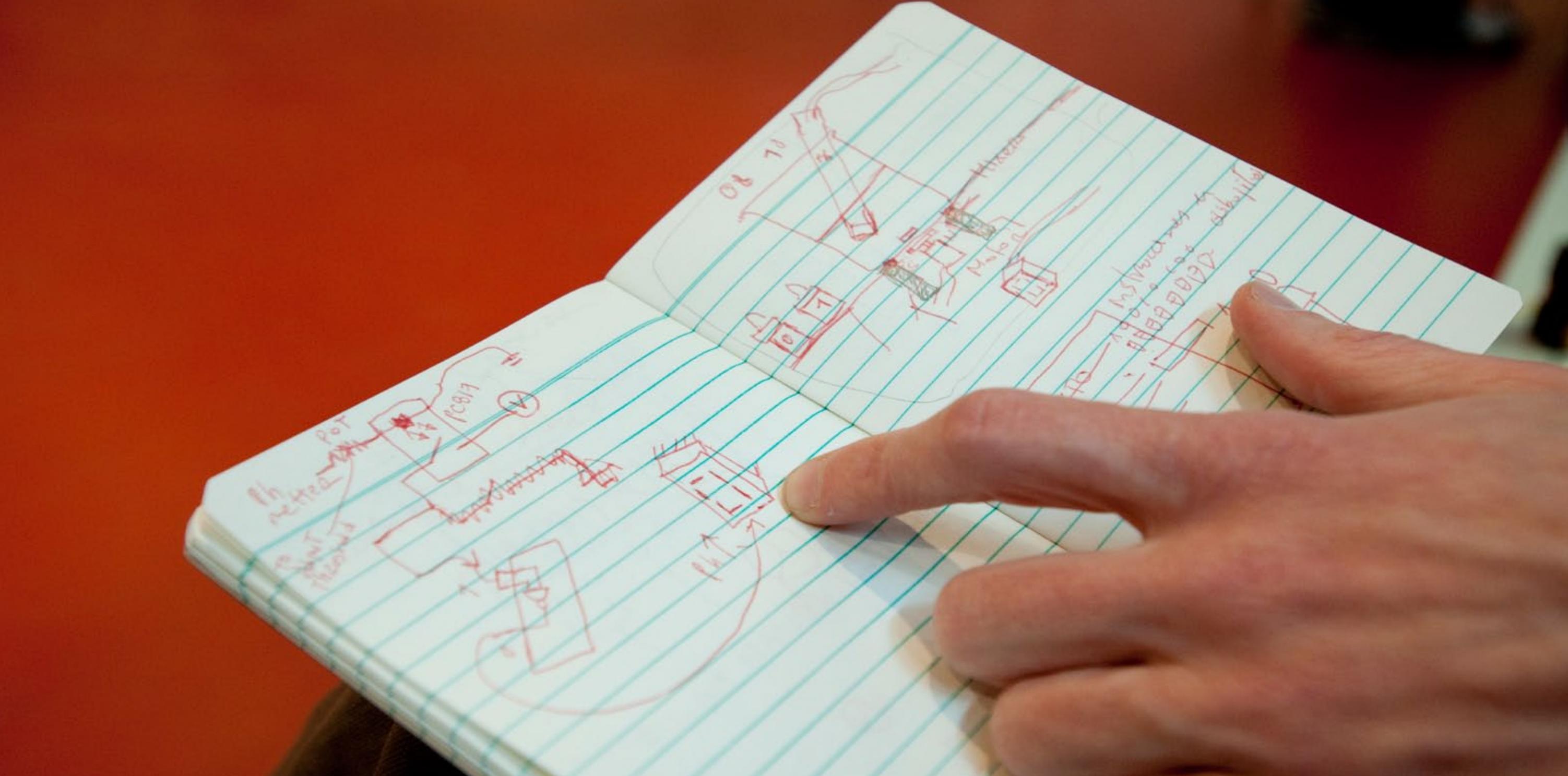


# Design Fiction

A short essay on design, science,  
fact and fiction.

Julian Bleecker  
March 2009



# DESIGN FICTION

*Fiction is evolutionarily valuable because it allows low-cost experimentation compared to trying things for real*

Dennis Dutton, overheard on Twitter <http://cli.gs/VvrmvQ>

Design is everywhere these days. It gets attached to anything, it seems. It's a way of distinguishing commodity from considered craftsmanship. Look around a bit and you'll find many kinds of endeavors — service design, business design, product design, experience design, industrial design, circuit design, finance design, research design — that have had design stitched onto design with a simple hyphen.

I might imagine that such happens rather generically. The hyphen is a trope, a grammatical meaning-making code that says —*we haven't entirely worked through what it might be to do finance and design simultaneously. We'll work it out, but know this — we're trying to do something different, and clever, and creative and thoughtful.*

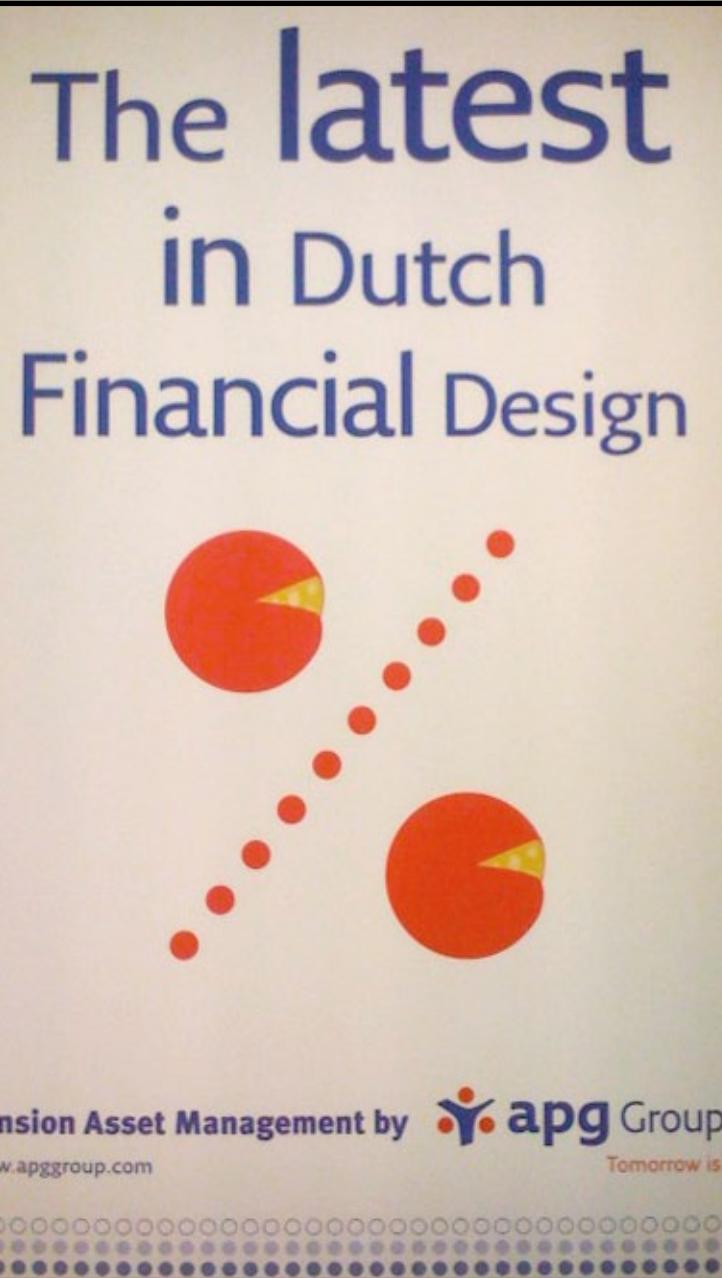
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Design allows you to use your imagination and creativity explicitly. Think as a designer thinks. Be different and think different. Make new, unexpected things come to life. Tell new stories. Reveal new experiences, new social practices, or that reflect upon today to contemplate innovative, new, habitable futures. Toss out the bland, routine, "proprietary" processes. Take some new assumptions for a walk. Try on a different set of specifications, goals and principles.

(My hunch is that if design continues to be applied like bad fashion to more areas of human practice, it will become blanched of its meaning over time, much as the application of e- or i- or interactive- or digital- to anything and everything quickly becomes another "and also" type of redundancy.)

When something is "designed" it suggests that there is some thoughtful exploration going on. Assuming design is about linking the imagination to its material form, when design is attached to something, like business or finance, we can take that to mean that there is some ambition to move beyond the existing ways of doing things, toward something that adheres to different principles and practices. Things get done differently somehow, or with a spirit that means to transcend merely following pre-defined steps. Design seems to be a notice that says there is some purposeful reflection and consideration going on expressed as the thoughtful, imaginative and material craft work activities of a designer.

There are many ways to express one's imagination. I've chosen fairly material ways over the years — engineering, art-technology, a small bit of writing. Nowadays, design occurs to me to be especially promising along side of the other forms of creative materialization I have explored. It provides a way to embed my imagination into the material things I've been making because it looks to be able to straddle the extremes of hard, cold fact (engineering) and the liminal, reflective and introspective (art). Design plays a role across this spectrum in various specific ways. There is no single, canonical design practice that is found across this range. But, just as there is "computer design" or "database design" or "application design" as it pertains to the world of science and engineering; just as there is design to be found in the routines of art making, whether adherence to style or genre in such a way as one might refer to art and design, we can say that design, if only the word but probably much more, is a practice with the ability to travel and be taken-up in various creative, material-making endeavors. Probably because



Playing off design in the Dutch context broadly, I found this advertisement at Amsterdam's Schiphol Airport in November of 2008, a month after most people mark the first widespread global economic quakes resulting from many years of very poor, negligent and, in some cases, criminal "financial design." The advertisement couples two particularly Dutch historical and cultural idioms: capitalism and design. The advertisement is aspirational, but the apg Group tag line — "Tomorrow is today" — is a painfully ironic bit of wisdom.

of where I am learning about design (an advanced design studio), and probably because I have not come to it formally, as through a degree program, there is an incredible malleability to how I can make design into something that is useful to what I do, which is making new, provocative sometimes preposterous things that reflect upon today and extrapolate into tomorrow.

From this starting place, I think of design as a kind of creative, imaginative authoring practice — a way of describing and materializing ideas that are still looking for the right place to live. A designed object can connect an idea to its expression as a made, crafted, instantiated object. These are like props or conversation pieces that help speculate, reflect and imagine, even without words. They are things around which discussions happen, even with only one other person, and that help us to imagine other kinds of worlds and experiences. These are material objects that have a form, certainly. But they become real before themselves, because they could never exist outside of an imagined use context, however mundane or vernacular that imagined context of social practices might be. Designed objects tell stories, even by themselves.

*If design can be a way of creating material objects that help tell a story, what kind of stories would it tell and in what style or genre? Might it be a kind of half-way between fact and fiction? Telling stories that appear real and legible, yet that are also speculating and extrapolating, or offering some sort of reflection on how things are, and how they might become something else?*

Design fiction as I am discussing it here is a conflation of design, science fact, and science fiction. It is a amalgamation of practices that together bends the expectations as to what each does on its own and ties them together into something new. It is a way of materializing ideas and speculations without the pragmatic curtailing that often happens when dead weights are fastened to the imagination.

The notion that fiction and fact could come together in a productive, creative way came up a couple of years ago while participating in a reading group where a colleague presented a draft of a paper that considered the science fiction basis of the science fact work he does. He saw a relationship between the creative science fiction of early television in Britain and the shared imaginary within the science fact world of his professional life. There were linkages certainly, suggesting that science fiction and science fact can

share common themes, objectives and visions of future worlds.

My colleague was not saying that the science of fact and the science of fiction were the same. In fact, he was explicitly not conflating the two. Nevertheless, coming from a computer science professor I found this idea intriguing in itself. It was certainly something to mull over.<sup>1</sup> What was percolating in my mind was this liminal possibility of a different approach to doing the same old tired stuff. This notion presented a new tact for creative exploration — a different approach to doing research.

I wondered — rather than an approach that adheres dogmatically to the principles of one discipline, where anything outside of that one field of practice is a contaminant that goes against sanctioned ways of working, why not take the route through the knotty, undisciplined tangle? Why not employ science fiction to stretch the imagination? Throw out the disciplinary constraints one assumes under the regime of fact and explore possible fictional logics and assumptions in order to reconsider the present.

Finally, I recognized that the science fact and the science fiction he was discussing were quite closely related *in practice* and probably quite inextricably and intimately tangled together, more so then the essay may have been letting on. In other words, I began to wonder if science fact and science fiction are actually two approaches to accomplishing the same goal — two ways of materializing ideas and the imagination.

My bias — arrived at through a mix of skepticism, experience, and desire to do things differently — is that, generally, it seems that science fiction does a much better job, if only in terms of its capacity to engage a wider audience which oftentimes matters more than the brilliant idea done alone in a basement.

My question is this — *how can science fiction be a purposeful, deliberate, direct participant in the practices of science fact?*

This is what this essay on design fiction is about. It is one measure manifesto, one measure getting some thinking off my chest, one measure reflection on what I think I have been doing all along, and one measure

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<sup>1</sup> It was also a bit of a reminder of some earlier work I had done while a graduate student, working on Virtual Reality at the University of Washington, Seattle where an informal rite was to thoroughly read William Gibson's "Neuromancer" and the Cyberpunk manifesto by Gibson and Bruce Sterling "Mirrorshades." More on this later.

explanation of why I am doing what I am doing.

Science fiction can be understood as a kind of writing that, in its stories, creates prototypes of other worlds, other experiences, other contexts for life based on the creative insights of the author. Designed objects — or designed fictions — can be understood similarly. They are assemblages of various sorts, part story, part material, part idea-articulating prop, part functional software. The assembled design fictions are component parts for different kinds of near future worlds. They are like artifacts brought back from those worlds in order to be examined, studied over. They are puzzles of a sort. A kind of object that has lots to say, but it is up to us to consider their meanings. They are complete specimens, but foreign in the sense that they represent a corner of some speculative world where things are different from how we might imagine the "future" to be, or how we imagine some other corner of the future to be. These worlds are "worlds" not because they contain everything, but because they contain enough to encourage our imaginations, which, as it turns out, are much better at filling out the questions, activities, logics, culture, interactions and practices of the imaginary worlds in which such a designed object might exist. They are like conversations pieces, as much as a good science fiction film or novel can be a thing with ideas embedded in it around which conversations occur, at least in the best of cases. A design fiction practice creates these conversation pieces, with the conversations being stories about the kinds of experiences and social rituals that might surround the designed object. Design fiction objects are totems through which a larger story can be told, or imagined or expressed. They are like artifacts from someplace else, telling stories about other worlds.

What are these stories? They are whatever stories you want to tell. They are objects that provide another way of expressing what you're thinking, perhaps before you've even figured out what your imagination and your ideas mean. Language is a tricky thing, often lacking the precision you'd like, which is why conversation pieces designed to provoke the imagination, open a discussion up to explore possibilities and provoke new considerations that words by themselves are not able to express. Heady stuff, but even in the simplest, vernacular contexts, such stories are starting points for creative exploration.

Design is the materialization of ideas shaped by points-of-view and principles that tell you "how" to go about materializing an idea. Principles are like specifications of a sort, only the kind I am describing are of a more

interpretive, imaginative and elastic sort. Not like engineering specifications, or the typical list of contents one finds in most any designed object — especially gadgets, like the flavors of WiFi, types of USB, quantities of gigabytes, diagonal screen inches, etc. Design principles are like the embedded DNA of a design, but can be as much a DNA about experiences to be had as instrumental measurements and adherence to manufacturing codes and trademark badges.

Design fiction is a way of exploring different approaches to making things, probing the material conclusions of your imagination, removing the usual constraints when designing for massive market commercialization — the ones that people in blue shirts and yellow ties call "realistic." This is a different genre of design. Not realism, but a genre that is forward looking, beyond incremental and makes an effort to explore new kinds of social interaction rituals. As much as science fact tells you what is and is not possible, design fiction understands constraints differently. Design fiction is about creative provocation, raising questions, innovation, and exploration.

Environment matters for these unconventional approaches. I play in a studio that's really exceptional, with incredibly creative designers whose have excellent listening skills and do not start with assumptions that are euphemisms for constraints and boundaries and limits. I'm not just saying that, it's a point of pride in the studio. We don't design products, if such is taken to mean the product of manufacturing plants, rather than the product of active, thoughtful imaginations. But we do design provocations that confront the assumptions about products, broadly. Our provocations are objects meant to produce new ways of thinking about the near future, optimistic futures, and critical, interrogative perspectives. We clarify and translate strategic vectors, using design to investigate the many imaginable near futures. It's a way of enhancing the corporate imagination, swerving conversations to new possibilities that are reasonable but often hidden in the glutony of overburdened markets of sameness. Running counter to convention is part of what some kinds of science fiction — rather, design fiction — allows for. This is especially valuable in the belly of a large organization with lots of history and lots of convention.

Design fiction is a mix of science fact, design and science fiction. It is a kind of authoring practice that recombines the traditions of writing and story telling with the material crafting of objects. Through this combination, design fiction creates socialized objects that tell stories — things that

participate in the creative process by encouraging the human imagination. The conclusion to the designed fiction are objects with stories. These are stories that speculate about new, different, distinctive social practices that assemble around and through these objects. Design fictions help tell stories that provoke and raise questions. Like props that help focus the imagination and speculate about possible near future worlds — whether profound change or simple, even mundane social practices.

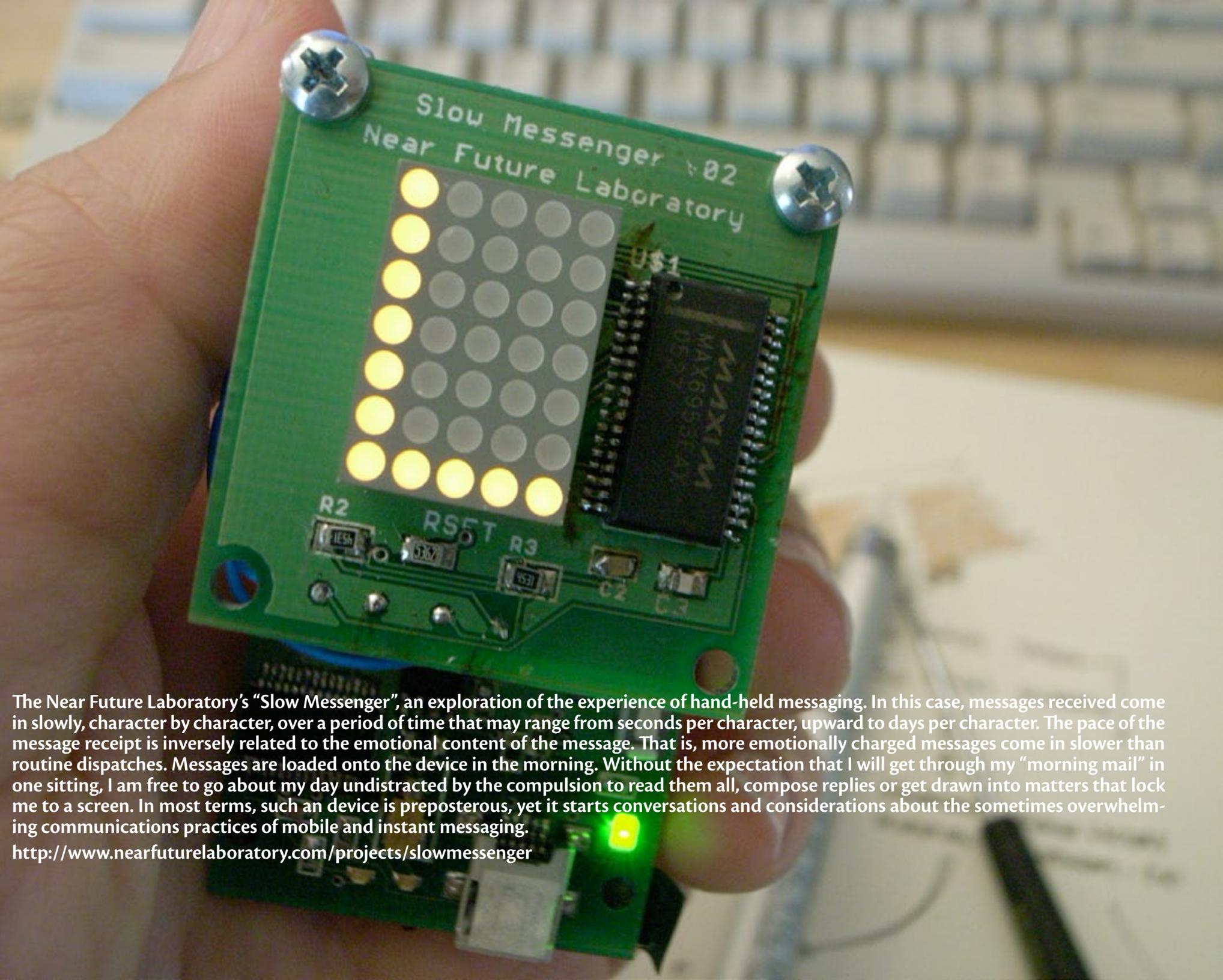
Design fiction does all of the unique things that science-fiction can do as a reflective, written story telling practice. Like science fiction, design fiction creates imaginative conversations about possible future worlds. Like some forms of science fiction, it speculates about a near future tomorrow, extrapolating from today. In the speculation, design fiction casts a critical eye on current object forms and the interaction rituals they allow and disallow. The extrapolations allow for speculation without the usual constraints introduced when “hard decisions” are made by the program manager whose concerns introduce the least-common denominator specifications that eliminate creative innovation. Design fiction is the cousin of science fiction. It is concerned more about exploring multiple potential futures rather than filling out the world with uninspired sameness. Design fiction creates opportunities for reflection as well as active making.

Design fiction works in the space between the arrogance of science fact, and the seriously playful imaginary of science fiction, making things that are both real and fake, but aware of the irony of the muddle — even claiming it as an advantage. It’s a design practice, first of all — because it makes no authority claims on the world, has no special stake in canonical truth; because it can work comfortably with the vernacular and pragmatic; because it has as part of its vocabulary the word “people” (not “users”) and all that implies; because it can operate with wit and paradox and a critical stance. It assumes nothing about the future, except that there can be simultaneous futures, and multiple futures, and simultaneous-multiple futures — even an end to everything.

In this way design fiction is a hybrid, hands-on practice that operates in a murky middle ground between ideas and their materialization, and between science fact and science fiction. It is a way of probing, sketching and exploring ideas. Through this practice, one bridges imagination and materialization by modeling, crafting things, telling stories through objects, which are now effectively conversation pieces in a very real sense. A bit like making

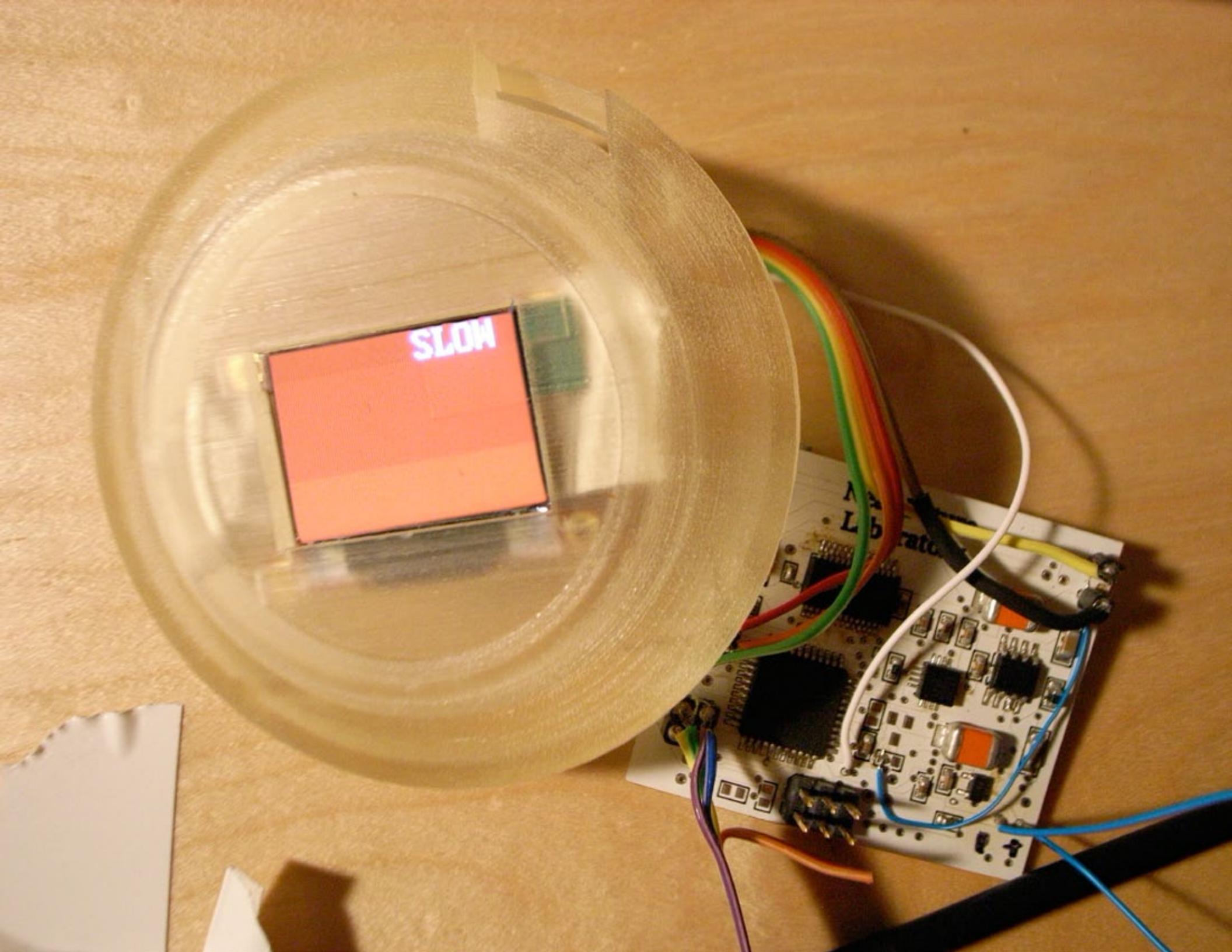
science fact prototypes, or props for a science fiction film, but not quite. We’ll get to the “how” later.

When I think of design this way, it feels like it should be understood slightly differently from the all-encompassing “design”, which is why I am referring to it as “design fiction.”



The Near Future Laboratory’s “Slow Messenger”, an exploration of the experience of hand-held messaging. In this case, messages received come in slowly, character by character, over a period of time that may range from seconds per character, upward to days per character. The pace of the message receipt is inversely related to the emotional content of the message. That is, more emotionally charged messages come in slower than routine dispatches. Messages are loaded onto the device in the morning. Without the expectation that I will get through my “morning mail” in one sitting, I am free to go about my day undistracted by the compulsion to read them all, compose replies or get drawn into matters that lock me to a screen. In most terms, such a device is preposterous, yet it starts conversations and considerations about the sometimes overwhelming communications practices of mobile and instant messaging.

<http://www.nearfuturelaboratory.com/projects/slowmessenger>



## 02

# DESIGN, SCIENCE, FACT AND FICTION

*..science fiction is not necessarily different from the technologies and the sciences it narrativizes, and in fact it creates the conditions for their possibility...In other words, the functions and attributes of genre science fiction.. have been incorporated by the technosciences.*

Eugene Thacker, The Science Fiction of Technoscience <http://cli.gs/nJnY9m>

This is a short essay about the relationship between design, science fiction and the material objects that help tell stories about the future — mostly props and special effects as used in film and other forms of visual stories, both factual and fictional. It's a first stab at describing some thinking that arose while reading that essay I just mentioned, which I'll introduce more completely now.

That colleague I alluded to earlier is called Paul Dourish. Together with Genevieve Bell he co-wrote an important essay on the relationship between science fiction and a field of computer science called ubiquitous computing, or "Ubicomp" for short. Paul is a Professor of Informatics at the School of Information and Computer Science at the University of California, Irvine,

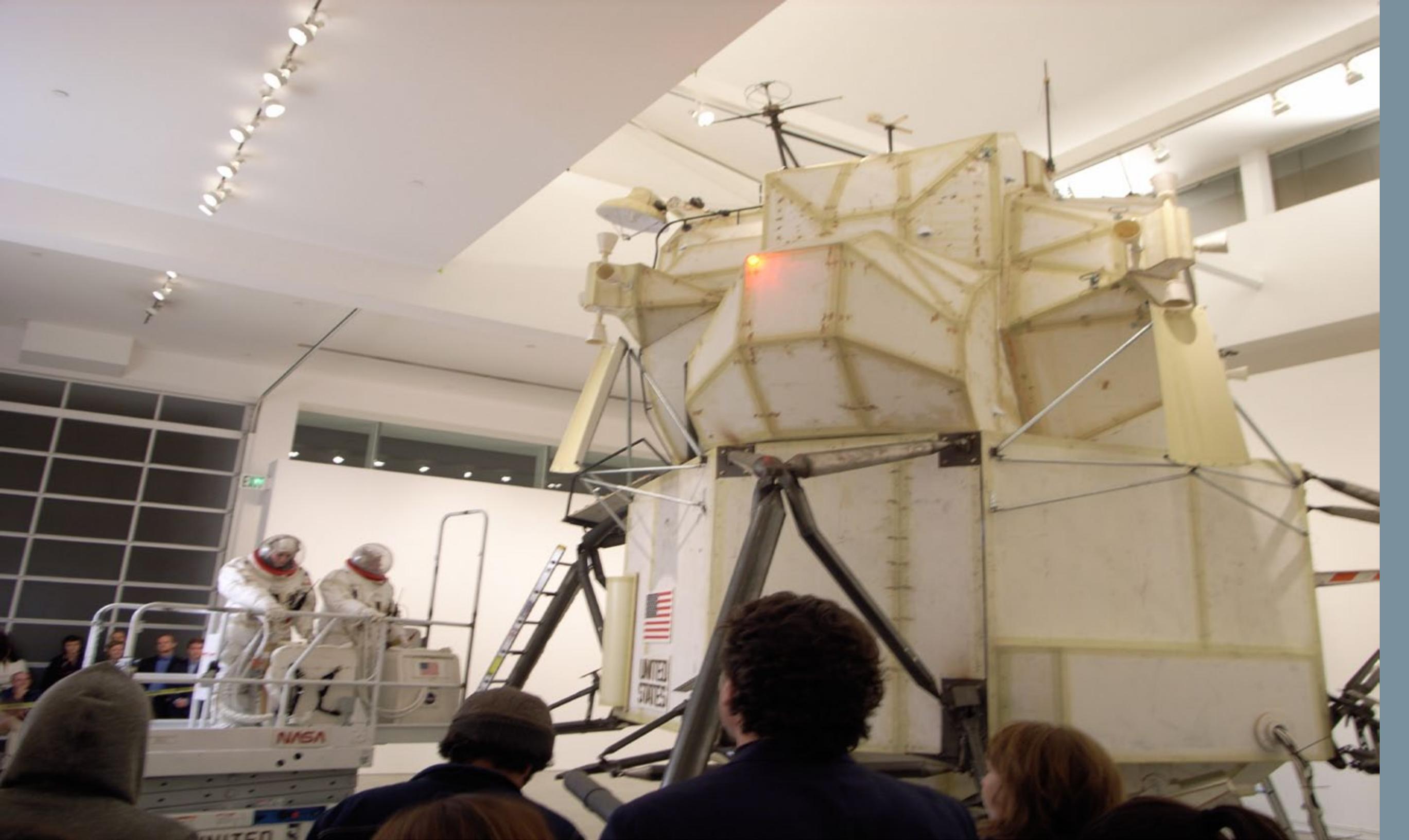
and Genevieve Bell is an anthropologist from Intel's People and Practices research group. So, they're smart, insightful, provocative folks. The essay they co-wrote is called "Resistance is Futile": Reading Science Fiction Alongside Ubiquitous Computing" It is an exploration of the relationship between Ubicomp principles on the one hand, and, on the other hand, the plot principles and general social milieu of some mostly British science fiction television shows of the 1970s and 1980s.

Their essay is meant to provide insights into Ubicomp itself, as a field of endeavor pioneered by incredibly smart people who grew up with a particular vision of a future, computationally rich world. By revealing some intriguing similarities in terms of the overlapping aspirations and matters-of-concern found within the science fiction stories and implicitly within Ubicomp's founding principles, the essay weaves together these two "genres" of science work — science fact and science fiction. What are the hopes, aspirations and visions of future worlds as expressed in 1970s era science fiction stories and their story props, devices and artifacts? How do they contrast with those of the ubiquitous computing project a couple of decades later, when the future scientists of the 1970s became the visionaries of the 1980s and onward?

When reading the essay, one gets the sense, if you haven't already had an inkling, that fiction and fact are really quite intertwined, the one shaping and informing the other in a productive, exciting way. And, going further, if such an inkling is to be had, why should one genre of science only *inform* the other? Without being explicit about it, the essay suggests that one may in fact "do" science fiction not necessarily as a crafter of stories in book form, as most science fiction practitioners do. In other words, *one can do science fiction not only as a writer of stories but also as a maker of things*.

There's a reformed kind of science fact just underneath what Bell and Dourish are describing, where one operates as an engineer-designer-speculator hybrid seeking a different approach to creative thinking and making. A science-fact that starts from the science-fiction anchorage rather than from the conservative rationality that undergirds most science fact work.

At least, that's what I read into it. My interpretation here goes further than the one offered in their essay. Bell and Dourish are careful to avoid suggesting that science genres are interchangeable in the way my reflections consider. They are not suggesting that Ubicomp is *actually* a kind of science

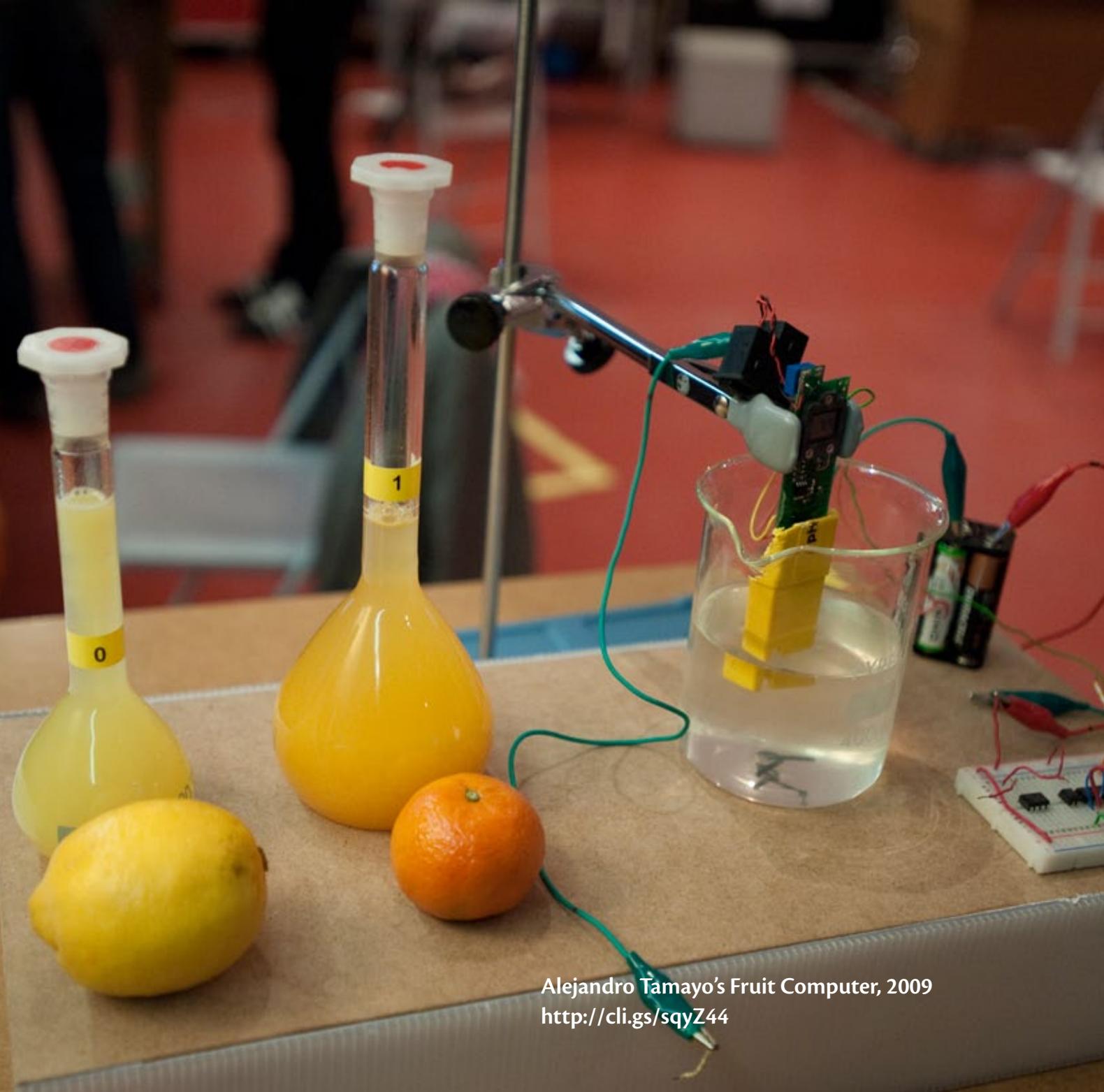


The artist Tom Sachs' sculpture/reenactment/performance called "Space Program". Sachs' project is a kind of performative mini-opera and love story between the two ingenue astronauts and their all-male ground crew that performs the entire lunar mission, from the astronaut's suit-up, lift-off, the journey to the moon, landing, geological excavations, through to their re-entry and celebration. The mini-opera reinterprets the mission as well as the equipment. Sachs' bearded art factory rebuilt the lunar lander to exacting detail with mostly found material, except where the details were overwritten. The interior of the lander contains a comfortable lounge sofa, the video game "Lunar Lander", paperback novels, cartons of cigarettes, bottles of booze, and tequila dispensed from a dentist's water jet.

This reinterpretation is, of course, a collapse of art-irony, wishful thinking and the facts of the lunar lander's construction. The joy of the piece is to be found in admiring the result of the process of hand-crafting a replica as a playful, joking reinterpretation, the attention to nuance and detail as well as the explicit celebration of such an epic undertaking of science and technology. It is perhaps a more fitting salute to the mission and all of its sacrifices than would be a staid, sober history museum presentation.

The "facts" of space travel are creatively reinterpreted to offer an imaginary science fiction story. Bits and pieces of the science facts are drawn together, including the exquisite hand-crafted detailing of the lunar lander, space suits and mission control. The line between science fact and science fiction is clear to anyone who knows what would be required of a space mission, of course. But the story makes one enjoy the creative science fictional re-imagining.

Tom Sachs: Space Program. 2009. <http://cli.gs/jMNLn7>.



Alejandro Tamayo's Fruit Computer, 2009  
<http://cli.gs/sqyZ44>

fiction, which is what I believe. I think that Ubicomp is in fact — science fiction. What Bell and Dourish do, and it's a pretty gutsy bit of work, is put the one alongside the other to reflect on the contrasts and similarities. This by itself is a remarkable step to take, especially considering the audience is that of a proper science fact journal where such a style of literary scholarship — “reading” the two science genres together — is more likely found in the humanities than in computer science and engineering. Juxtaposing in any fashion the “real” work of science fact with the “imaginary” work of science fiction — well, you just don’t do that. It’s not good old fashioned hard science work. It’s not the same as running a study or building a new data encryption algorithm and talking about it in a scientific paper with spartan, terse prose absent of all metaphor. These kinds things are real science work. From a conservative, pragmatic engineering perspective in which one would never, ever put fact alongside of fiction and expect anything better than ridicule and a nasty peer review — you only run studies or invest time in finding new data encryption algorithms.

Bell and Dourish make their perspective plain when they caution that they do not mean to suggest “..that [ubiquitous computing and science fiction] are equivalent or interchangeable; we want to read ubiquitous computing alongside science fiction, not to read ubiquitous computing as science fiction.” Perhaps they make this move because they really believe this, or perhaps because they want to avoid that ridicule and those nasty peer review notes.

Nevertheless, or perhaps because many good things have come from a bit of ridicule, I became intrigued by the knots of society, technology, politics, and visions of our future imaginary suggested in their essay. These knots, from a slightly sideways glance, create larger interconnected assemblages that are more than a curious reflection on how science fiction relates to Ubicomp. Just at the periphery of their insights I saw the possibility that serious, hands-on work could employ science fiction as a design framework. Like writing and telling stories with design objects, their user scenarios become plot points, filing out richer narratives about people and their quotidian experiences, not scenarios about users punching at little plastic keyboards.

Their essay foregrounds the ways that science fact and science fiction are the same, simultaneous activity, both ways of materializing ideas. When I was asked to write a response to go alongside of the essay’s publication, I had the chance to think about Ubicomp and science fiction and, from there, broader questions arose.

The questions I thought about are these: How can design participate in shaping possible near future worlds? How can the integration of story telling, technology, art and design provide opportunities to re-imagine how the world may be in the future? How does the material act of making and crafting things — real, material objects — shape how we think about what is possible and how we think about what should be possible?

I came to the conclusion that there was a practice there, just at the contours of their essay that may as well be called “Design Fiction.”

What follows is a short synthesis of this thinking. The overall goal is modest, which is simply to share some insights and experiences that have helped me think differently about how ideas are linked to their materialization by enveloping fact with fiction in creative, productive ways. Rather than constraining the ways in which things are made and designed, explore the way fiction is able to probe the further reaches of more habitable near future worlds. This is not meant to be an all-encompassing exposition. Instead, I look at a few examples with some insights to go along with them. It is less a theoretical statement than a travelogue of experiences.

Here is the outline of what follows.

1. **Fact and Fiction Swap Properties.** These are some thoughts on the ways in which fact and fiction are anchorages for a bridge of continuous variance between the two. Nothing holds fast and there is plenty of continuous traffic back and forth. These are insights into how fact and fiction are pretty well tangled together despite every attempt to keep them distinct.

2. **Fiction follows Fact.** How are fact and fiction tangled up? In this example, I start from the science fiction anchorage and show how science fiction is inextricably knotted to science fact. My example comes from the film *Minority Report* and the mutual, simultaneous speculations about gesture-based interaction at the human-computer interface. David A. Kirby’s notion of the *diegetic prototype* provides a principle for understanding the ways in which science fact and science fiction always need each other to survive. In many ways, they are mutually dependent, the one using the other to define its own contours.

3. **Fact follows Fiction.** A parallel example of how fiction and fact are tangled up, this one starting from the anchorage of science fact, revealing the complicated interweaving of science fiction ideas, idioms, aspirations and tropes that mutually and simultaneously shape science genres. In this example, I re-introduce Ubicomp through the two essays by Bell and Dourish. This is to outline a contour of Ubicomp that reveals how it is actually a science fiction.



Science fiction has been aligned to the emergence of modern historical consciousness in which the historical past is reflected upon and given account in a way that is richer, with more lived drama than annals or chronicles. The historical novel “fills in” the historical chronicle with story, not merely discoveries, the progression of troops across the continent, or the birth of future monarchs.

The modern historical consciousness is a contested topic, but for the purposes here can be stated simply as a perspective that understands the past as culturally particular and with no direct, anticipatory relationship to today’s present. The past can only be understood as a reflection based upon one’s experiences, not something fixed by the chronicle or a history book-of-facts. The past is told and recounted, never experienced directly. In this way, historical writing is a way of creating an interpreted continuity from “then” toward “now” so as to make the present “make sense” based on the progression of past narratives that we then call our history.

As the modern understanding of historical thinking emerges in the late nineteenth century, particular forms of stories about the future-to-come arise, especially those that chart a utopian outline of “up-and-to-the-right” of progress. Defamiliarizing and disrupting this grid to anticipate (or create) alternative possible futures is what science fiction does. Moreover, and perhaps more importantly, science fiction can only really be stories about the present just as histories can only ever be reflections on the past based on the present moment. So then design fiction, borrowing from science fiction, is the embodiment of materialized reflections on design today, as well as projections and anticipations of the designed futures.

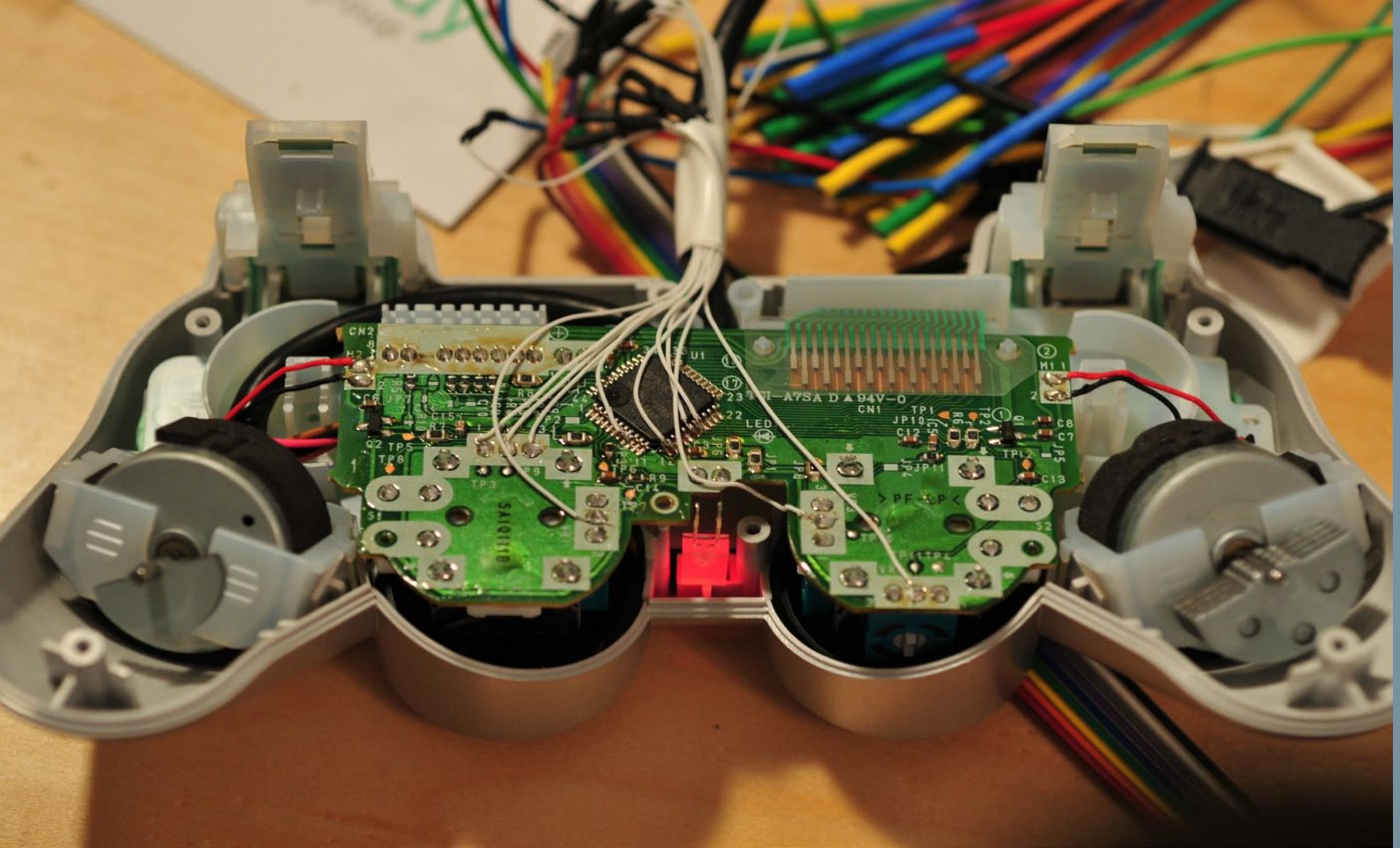
Science fiction as a literary genre serves its purpose as a cultural form in the ways it anticipates and reflects upon the possibilities of a different, other world. It is unique in the canon of literary genres in the way it represents the future, which has been argued to happen broadly in two ways. First, as a way of rendering the world to be in such a way as to “soften the blow” of the rapid pace of technological change. The future world of this kind of science fiction charts the “up and to the right” graph of future progress, wherever that graph may lead, but typically the terminus is the gleaming, streamlined, horn-of-plenty style of Utopian future.

The second form and the one I find more satisfying is less a tour of future perfection and more a reflection on the current state of affairs that serves to, as Frederic Jameson describes it, “defamiliarize and restructure our experience of our own present..” [cf “Progress versus utopia, or, can we imagine the future?” in Frederic Jameson’s “Archeologies of the Future” <http://cli.gs/GMH2EH>]

In the context of design fiction, this defamiliarization serves the purpose of upsetting things in a productive way, to examine new possible forms, styles and experiences — new rituals and their attendant object materializations. To break away from the insular, habituated forms, experiences, rituals and expectations. Rather than assuming the progression of ideas and their materialization along a predefined chart of incremental progress, design fiction assumes no particular course, no specific future world. It begins with the terms familiar to science fiction which is indirection, distraction, disruption and displacement.

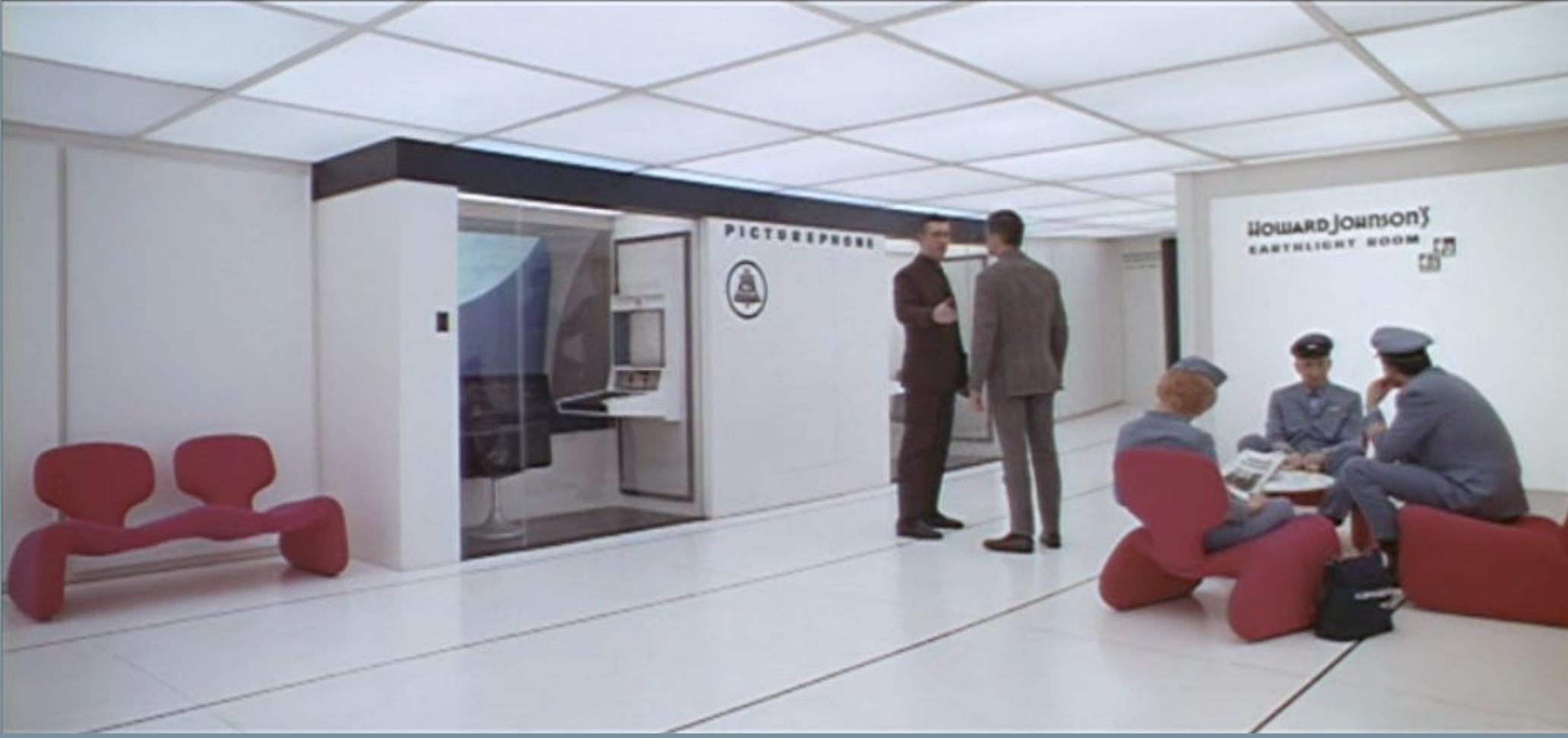
Design fiction pushes aside the boring, dangerous chart of “up and to the right” progress which, particularly at this time of global economic and environmental calamity, we should finally admit to ourselves is a failed illusion.

Design fiction, like science fiction, speculates, reflects and extrapolates, looking at today from the side, or sideways and forming a critical, introspective perspective that can project into new (future) forms.



Reconfiguring a standard Sony Playstation controller, modifying it so that it, over time, its controls become less responsive, as if one's game character gets tired to the point of exhaustion. So, for example, in a game where one's character is running around a fictional city as in the Grand Theft Auto series of games, or rolling things up as in the frantic Katamari Damacy, these hyperactive characters will become exhausted over time. Effectively, they won't move despite the (real) player's attempting to press them onward by manipulating the modified joystick. The joystick "gets" its energy from a activity monitoring device called Flavonoid that the player can wear throughout the day. More activity in the "real world" allows the game characters to sustain their "game world" activity longer.

<http://www.nearfuturelaboratory.com/projects/psx>



"Though scores of earlier motion pictures had endeavored to project man into space and speculate upon the consequences of his first contact with an extraterrestrial intelligence, *2001: A Space Odyssey* was decidedly unique, both in concept and execution. In a cinematic genre where dramatic license was customarily stretched to preposterous proportions, *2001* remained staunchly rooted in the scientific principles that were so often disregarded by its predecessors."

This quote is from the cover article in *Cineflex*, no. 85 on the production of Stanley Kubrick and Arthur C. Clarke's *2001: A Space Odyssey*. What makes *2001* worth getting just a bit carried away over is the way it was simultaneous with the thinking and making of space travel. The film production took seriously the science fact of space travel by enlisting the insights of practicing rocket scientists. This was 1966-68 after all, and the space race was in full swing. There was a great deal of attention on the effort both at space agencies and within Kubrick and Clarke's effort to realize where this race would end up, 30 years in the

near future. It is a further indication of the degree to which science fact and the science fiction were intertwined that Kubrick explored the possibility of taking out insurance with Lloyd's of London against the film's possible losses should a concurrent space probe's mission to Mars reveal some bit of science fact — extraterrestrial life? — that would reduce the credibility of his film.

As was typical, Kubrick's epic production happened on his own terms. It took four years from the time Kubrick contacted Clarke about collaborating, until the premiere public screening in 1968 to complete the approximately \$10 million production. A fair portion of the time was spent in pre-production, considering everything — the techniques and technologies of deep-space travel, the nuances of artificial intelligence, the kinds of advanced composite materials and "GUI" displays that might be found on spacecraft in *2001*. The detailing and finishing was meticulous and the speculation as grounded in best principles regarding space travel and related technologies, projected forward into



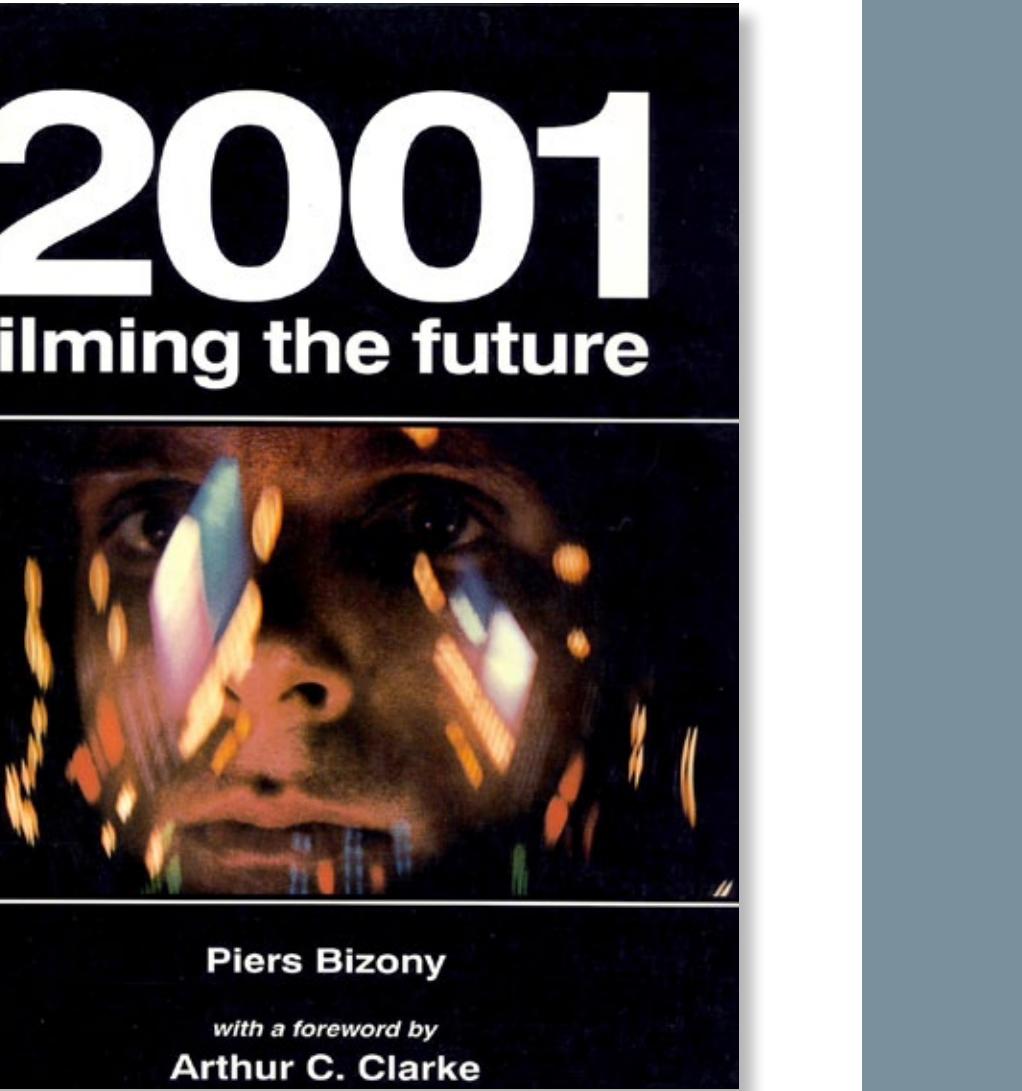
the future.

This approach to story telling and speculating was, at the time, nearly unique as an approach to production for science fiction film. (*Destination Moon* (1950) and *The Conquest of Space* (1955) are notable for their production and special effects authenticity based on science facts of the day.) For example, the instrument displays on the spacecraft had no real precedent in science fact. There was effectively no "science" of digital information visualization or graphical user interfaces as such at the time, nor were there off-the-shelf programming tools for developing computer graphics displays semi-automatically, such as Adobe Flash or Processing. Instead, the special effects team used past-ups under a stop-motion camera rig to create the instrument display effects which were rear-projected onto control panels. According to Douglas Trumbull, one of several effects supervisors on the film, it took almost a year to produce the readouts for *2001*. (*Creating Special Effects for 2001: A Space Odyssey* by Douglas Trumbull in *The Making of 2001: A*

*Space Odyssey*, Stephanie Schwam editor. <http://cli.gs/W7g70U>)

"*2001* is no mere science-fiction movie. In truth, to be really accurate, it is more like 'science-fact' simply extended a few decades into the future. In his quest for complete authenticity in terms of present and near-future technology, Kubrick consulted constantly with more than thirty technical experts and the results..are an accurate forecast of things to come." In *Filming 2001: A Space Odyssey*, by Herb A. Lightman in *The Making of 2001: A Space Odyssey*. <http://cli.gs/W7g70U>)

Kubrick engaged many scientists and engineers, including two fellows called Harry Lange and Frederick Ordway. Lange and Ordway happened to arrive in New York City while Clarke and Kubrick were there scriptwriting. They were in town to attend a conference of the American Institute of Aeronautics and Astronautics and to promote a book their space consultancy company had written on extra-terrestrial intelligence. The two were formerly NASA technologists, with the added benefit for a visual story production that Lange was both a



2001: *Filming the Future* by Piers Bizony. Sadly, out of print but still to be found [here and there](#). It provides a visual story of the film's production as well as sketches and drawings by the film's designers.  
<http://cli.gs/ZX9R5t>

draftsman, colorist and intimate with the details of "propulsion systems, radar navigation, docking techniques, and many other matters preoccupying the U.S. aerospace technologists of the day. His job had been to visualize as-yet-unborn vehicle concepts, so that NASA..could communicate their ideas for the future." (*Shipbuilding* by Piers Bizony in *The Making of 2001: A Space Odyssey*. <http://cli.gs/W7g70U>)

(Parenthetically, fellow obsessives will want to consider the HAL 9000 Project's computer screensaver [<http://cli.gs/rXStq3>] and consider perusing sci-fi-o-rama for the fan-friendly discussions of 2001 minutiae at <http://cli.gs/JBSeV3>)

Proper engineering firms were hired to work within the production design to do such things as construct the space suits that astronauts used based on the science fact, such as they were known at the time, about deep space environments. Materials choices were made based on engineering principles and extrapolations of material science into the century following the film production. Models for the space craft went through multiple design iterations, mostly out of Kubrick's tireless and wearying perfectionism, but also as reflections on the evolving state-of-the-art in that era's "big science" surrounding the space race. The film is perhaps most effective for its uncanny ability to make the future legible to the audience, at least insofar as it created indexical references to familiar, quotidian bits of 1960s culture as projected into the year 2001.

The overall approach of the production points to a way of designing not only a visual story, but also creating a shared, collective imaginary about a near future world that explores of a myriad of possibilities. Not only the story itself, but also the 'things in the corner', at the edge of the production, those things that do not entirely occupy the visual frame. The production forces consideration of what is necessary to get the job of filming done, but also allows for time to think through aspects of a world quite different from the present of the 1960s — such as optical storage for computers of the future, or the kinds of materials that might be used for spacecraft, or the small curiosities of routine earth-to-moon space shuttling, or what companies and brands may exist 30 years in the future.

Despite what one might think about the drama or the pacing or the story of 2001, it is worth considering, especially in the context of "design fiction" for its production practices and its approach to thinking-through a possible future. Collapsing science fact together with science fiction to sketch out this trajectory is perhaps the only sensible way to create such a compelling vision whilst on the historical cusp of that vision coming into being.



Reading material close at hand in the design studio. Recreation, or inspiration?

## 03

### FACT AND FICTION SWAP PROPERTIES

Insights into how fact and fiction are all tangled up, anyway.

As a principle, the science of facts and the science of fictions have their own distinctive characteristics which helps draw hard boundaries between the one and the other. But, in practice (which is what really matters when things are made), these two genres of science are quite tangled together. There are knots of intermingling ideas, aspirations and objects that blur any perceived boundaries and bind together these two kinds of science together. Engaging these knots, making the knots deliberately — this is the practice of design fiction.

Design fiction happens when you tie together fact and fiction and play comfortably and happily in the between. In between face and fiction is where designed fictions are most active. Designed fictions are the result of

tensions that arises from being in a bit of a muddle, neither firmly staking yourself on the side of fact, nor on the side of fiction. Designed fictions are projections and extrapolations meant to explore possible near futures. They are speculations on what the next “now” will be like, always remembering no possible future is out of the question. The only caveat is that extrapolating through designed fictions into the near future are certainly not along the tired old future projection graphs that always seem to run up and to the right — always smaller, faster, cheaper, brighter. Design based on this set of principles are optimistic and hopeful, but also naive and uncritical. They don’t expect anything except continuity. There are no disruptions in this kind of fantasy future. The “up and to the right” futures never last too long. There are no continuities. We are looking to explore inspired alternatives to this lack of imagination.

In this one small instance I am proposing that this knotting action — the tying together of fact and fiction — become a deliberate, conscientious, named part of the design practice, rather than something to be avoided or hidden after things are done. Revel in the messiness, the speculation, and the confusion that arises when you don’t play by the old rules of the rational, modern world. Create the “action” of speculation and fiction-making as part of the design practice. Throw out the silly sober “proprietary processes” that every design/creative/engineering practice claims, and that ultimately lead to the same old conclusions anyway. Look for innovation by playing against conservative rules that shape now bankrupt commodity markets of uninspired, throw-away designs, and barely habitable near futures.

The unusual, unexpected, multiple near futures that sustain not only the ecological earth but the emerging socially networked and connected earth are especially in need of a more active voice, if only to create an alternative to the programmed myth that there is only one future on the flat graph that goes up and to the right — or that there is only one future that only takes time to distribute evenly.

Rather than concerning ourselves only with the conclusions of design fiction, lets look where it happens, in the entanglements before things are worked out and given a gloss. Before the end is the messy middle bits, when things seem as though they’ll never get finished. The conclusion — the finish — almost always hides the struggle for completion. The end results of evolving an idea into a material form are only the final punctuation to a longer muddle in which ideas and their object-proxies struggle to express

themselves against other inconsonant ideas and object-proxies. It's very much something one might call "political" the way a design — the knot of all the work that goes into making the thing — achieves its conclusion. With design fiction, you begin to find lots of bastard ideas; lots of "memes" with rather muddled origin stories, many of which find their earliest expressions in science fiction, as it turns out.

Where do you look for the practice, the actual struggle that reveals the more interesting activity of humans willing a future into existence? It all happens where ideas swap properties, becoming in their way the material thing. A mess is made of previously well-disciplined, coherent categories of ideas. Tracing the knots illuminates certain aspects of a design fiction exercise. You notice an idea from science fiction cohere as science fact, or a speculation that would be difficult to categorize as science fact has found its way into a bit of near future science fiction that then becomes more widely circulated than if it had remained an utterance within an obscure professional science society journal.

Design fiction is somewhere in the space between the science of fact and the science of fiction, which is, I'm suggesting, where the science work all happens anyway. The fact and fiction are extremes — these are really not much more than far-away anchor points where no one really works. We're always only ever in between. There is no fact without also spending some time speculating in a fictional mode, asking the "what if.?" questions. Any good science fiction practitioner will spend time with those who consider themselves to be working in the science fact idiom, and everyone's happy to learn from each other, activating their imaginations in ways that are reflected in the film, or book or as scribbles on the white board or cobbled together "prototypes" on the lab bench. Science fact and science fiction are there as waypoints and references that people can claim to help them describe to others what they do. Science fact and science fiction provide a list of characteristic properties that simplify the problem of organizing and categorizing specific well-bounded kinds of cultural production.

People who claim science fact as the practice idiom in which they do their work would never really say they do not imagine things beyond "fact." Certainly they enter into a sort of science fiction, which they might describe as speculating and "brainstorming." This is a kind of science fiction that is made legitimate by calling its result hypotheticals, or by explaining these speculations as "theoretical prototypes", or "just ideas" as if to say, "*I know*

*this is silly and not really possible, nevertheless..*" These are explanations that are like perimeter alarms going off around disciplinary turf, indicating that we're beginning to breech the hard, well-policed border between the proper work of science fact and the murky terrain of science fiction.

In the same way, most any science fiction author would never say they do not allow the influence of science fact to enter into their imagination, shaping and informing the stories they write. I should note that science fiction has a genre identifier for their "hypothetical" idiom — hard science fiction, where "hard" refers to rigor, the hard-set of scientific principles to support the accuracy of any science content within the story. Hard science fiction is the perimeter alarm from the other side, as science fiction incursions make basis its fiction-world epistemologies on science fact.

This terrain "claiming", whether fact from fiction, or fiction from fact is where the two science genres swap properties. The science happens in between the fact and the fiction, between the extremities. Across the borders set up to partition disciplines is where design fiction lives, sharing and borrowing and swapping properties from fact and fiction, intermingling and generally making a hash of things.

We can say that the idea that science fact and science fiction intermingle is not something terribly new, although it can be an unsettling idea. After all, facts are facts and fiction — well, that's something you concern yourself with to unwind after the hard work of, say, detecting elusive elementary particles with multi-billion dollar data filters and data collectors called super colliders. No one wants to say that the laws of aerodynamics are based in science fiction, and do so right before you get on an airplane. But, really — any science is always a bit of speculation, hope, imagination and self-assured declarations. It is as if science fiction is the imagination and science fact is the conclusion to this imagining. Science fact is where science fiction ideas go to become material things.

It so happens that I can't help but dig deeper into this interrelationship between science fact and science fiction. It's part of a larger project to understand how culture circulates, especially the formation of ideas, knowledge and their object proxies. Which ideas get to circulate out in the world and why? How do ideas obtain their "mass" and accumulate attention and conversation or become sidelined and obsolete? The larger project is especially about understanding the mechanisms by which material and ideas swap

properties, which is why I want to understand and do design.

At this point, for this topic of design fiction, I'm inclined to a bit more analysis, perhaps because I'm intrigued by the muddle of anything hybrid, which I see in this undisciplinary mix of design, science, fact and fiction. The longer bit of this essay to follow is an exploration of the ways that science fact and science fiction get all tangled up, creating a knot of knowledge and its circulation through larger meaning-making assemblages. It's an exploration of how the science of fact and the science of fiction blur together in practice, always. Rather than focusing on this in a pedantic way, I am doing it to better understand how undisciplined *property swapping* amongst science fact and science fiction can yield an exciting form of design work that involves thinking, crafting, speculating and imagining.

I am going to start with one simple but rich example of this property swapping. The example is meant to show a bit of design fiction in action through the film *Minority Report*. Two things I attempt to draw out in this example.

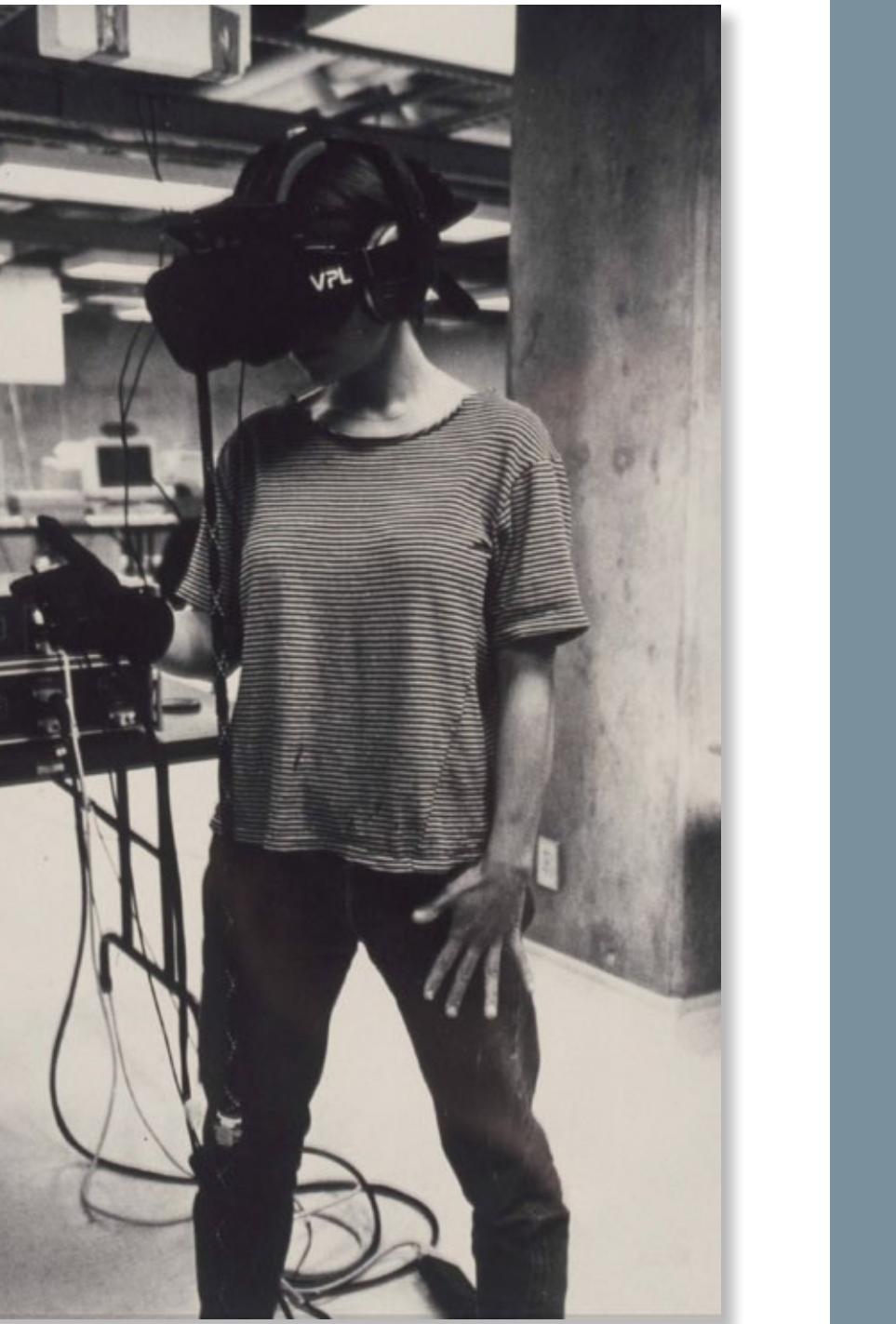
The first is the strength of a good story in contributing to the design fiction process. What I mean to do in this example is to highlight how good ideas circulate well when they have a story to go along with them, and a story that is about more than a gadget. In fact, remove the gadget all together and make it a story about people and the timelessness of human fundamental social practices. Then put the gadget back in, as a prop, that helps move the story along. Objects themselves, which are never devoid of context even if it is something we only imagine and place around the object to give it meaning. A particularly rich context, a good story that involves people and their social practices rather than fetishizing the object and its imagined possibilities — this is what design fiction aspires to. And in the film *Minority Report*, I find that this is done particularly well.

The "gadgets" in the P.K. Dick / Spielberg / Cruise future of 2054 are not fetishized as things-in-themselves. They are not the perfection one might of them if they were advertised as the next great thing, which is an idiom of design-marketing meant to play to ones gullibility and expectations of increasing utility and perfection as if, in this next new gadget from industry, all of the problems that the previous gadget had will finally be worked out.

Rather the *Minority Report* props are instruments that ultimately become expressions of human fallibility and hubris. They aren't primarily useful as

design ideas for future technologies — although they are often received as such, and every advantage. Instead, and in their most useful mode as design fiction objects, they serve to incite conversations that are more cautionary than aspirational.

The second feature of the Minority Part analysis is the property swapping between science makers and film makers whereby the film production deploys researchers and thinkers to consider facets of 2054 that are extrapolations and speculations from the present. Simultaneously, researchers and thinkers deploy the film's production to consider facets of 2054 that are extrapolations and speculations from the present. The knots that entangle film fiction and design-technology fact are an instance of a kind of design fiction.



While a restless graduate student at the University of Washington I worked at a place called the Human Interface Technology Lab, or HITLab. The lab was working quite hard on virtual reality (VR), another (again) of a kind of immersive, 3D environment that, today, one might experience as something like Second Life. The technology had a basic instrumental archetype canonized in a pair of \$250,000 machines (one for each eyeball) called, appropriately, the RealityEngine. With video head mount that looked like a scuba-mask, one could experience a kind of digital virtual world environment that was exciting for what it suggested for the future, but very rough and sparse in its execution. As I was new to the new HITLab (still in temporary trailers on a muddy slope by the campus' steam plant), I went through the informal socialization rituals of acquainting myself to the other members of the team — and to the idioms by which the lab shared its collective imaginary about what exactly was going on here, and what was VR. Anything that touches the word "reality" needs some pretty fleet-footed references to help describe what's going on, and a good set of anchor points so one can do the indexical language trick of "it's like that thing in.." For the HITLab, the closest we got to a shared technical manual was William Gibson's "Neuromancer" which I was encouraged to read closely before I got too far involved and risked the chance of being left out of the conversations that equated what we were making with Gibson's "Cyberspace Deck", amongst other science fiction props. I mean — that's what we said. There was no irony. It was the reference point. I'm serious. I mean..this is from a paper that Randy Walser from Autodesk wrote at this same time, when VR was going to fix everything:

*"In William Gibson's stories starting with Neuromancer, people use an instrument called a "deck" to "jack" into cyberspace. The instrument that Gibson describes is small enough to fit in a drawer, and directly stimulates the human nervous system. While Gibson's vision is beyond the reach of today's technology, it is nonetheless possible, today, to achieve many of the effects to which Gibson alludes. A number of companies and organizations are actively developing the essential elements of a cyberspace deck (though not everyone has adopted the term "deck"). These groups include NASA, University of North Carolina, University of Washington, Artificial Reality Corp., VPL Research, and Autodesk, along with numerous others who are starting new R&D programs."*

[<http://cli.gs/uEXDzv>]

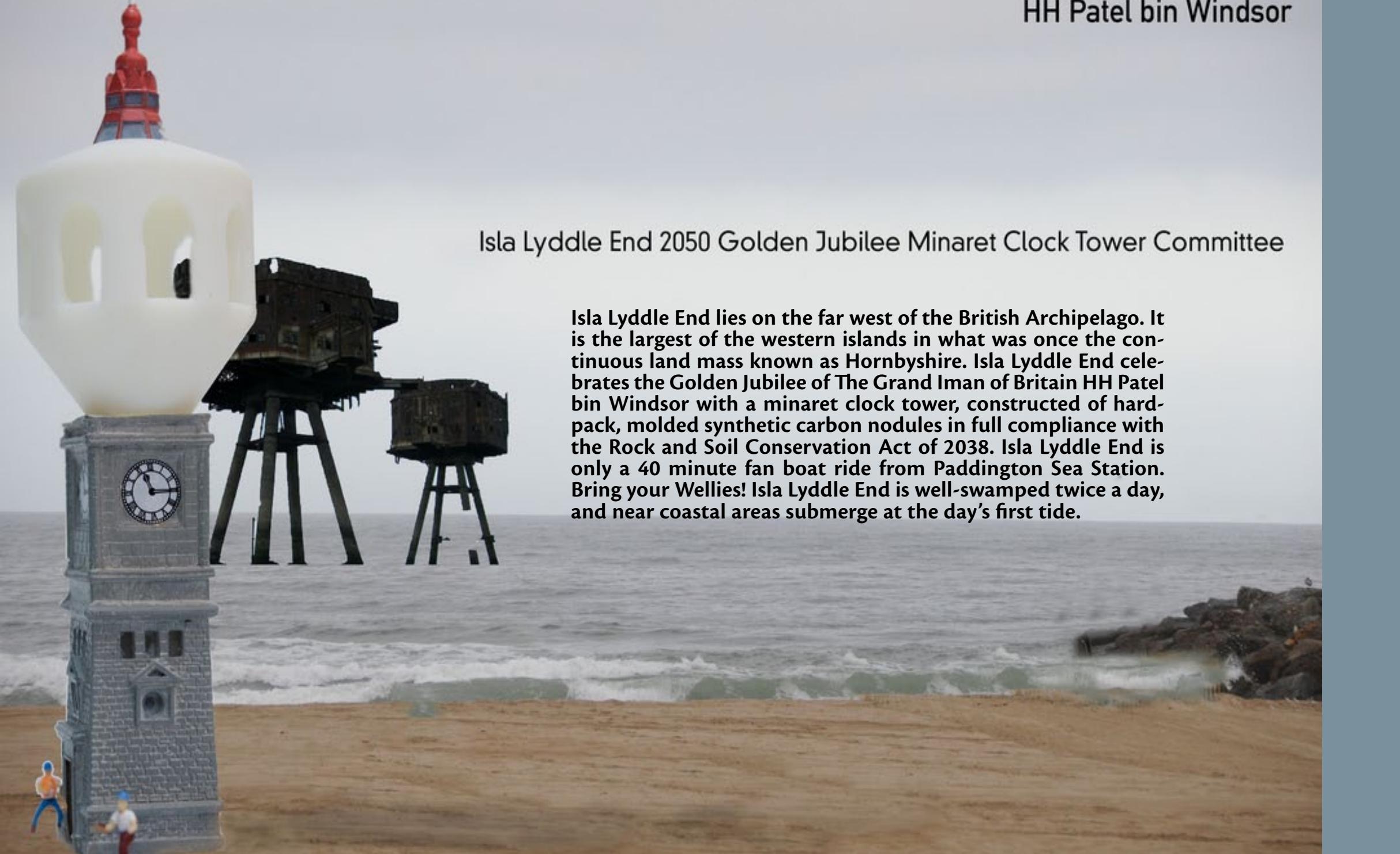
Shortly after the HITLab, a number of us formed a company called World Design where we meant to continue our speculations about

what "virtual worlds" technology could do in a commercial context. There's a larger story there, perhaps. But the more curious fact to note is that our corporate bard was an informal ally from the neighborhood of ideas who also lived nearby in Seattle, Neal Stephenson, the science fiction author of Snowcrash. Stephenson's science fiction, like that of Rucker, Gibson's and Sterling's, our other cyberpunk heros, were as much design and style manuals as they were entertaining literature. Except for the overdose of hubris — which you just have to take with every bit of new technoscience that's trying to sell its near future self — there's nothing wrong with this discursive slip-and-slide that entangles science fact and science fiction. It's all good stuff. It's part of the practice of design fiction. The knitting together of fiction and reality, ideas and their materialization happens because of the powerful language objects found in the science fiction. Just as quickly, the "reality" circulates back into the science fiction.

Each kind of science provides for the other the indices and anchor points necessary to tell the story of this near future vision of VR, which real companies with mostly real funding sources were cobbling together. The objects that authors like William Gibson craft through words are kinds of designed objects that help fill out the vision, inciting conversations, providing backdrops, set pieces and props. The Cyberspace Deck. Gibson wrote about it and it had a story that was compelling enough that it may as well be built. The written objects creates a goal line, a critical path toward the successful completion of the VR mythos. Together, the linkages that connect fact and fiction are ways of filling in that shared imaginary, which then knits the social formations of everyone and everything together.

Bruno Latour would remind us that this is the socialization of objects. Technology is precisely the socialization of ideas via object proxies. You don't need to look much further than this VR anecdote to appreciate how technology is always already the assemblage of social practices. It happens in the circulation of ideas and stories that draw in a multitude of perspectives, and ways of expressing the imagination, from circuit diagrams to galactic adventures.

# Celebrating The Golden Jubilee of The Royal Grand Iman of The British Archipelego HH Patel bin Windsor



## Isla Lyddle End 2050 Golden Jubilee Minaret Clock Tower Committee

Isla Lyddle End lies on the far west of the British Archipelago. It is the largest of the western islands in what was once the continuous land mass known as Hornbyshire. Isla Lyddle End celebrates the Golden Jubilee of The Grand Iman of Britain HH Patel bin Windsor with a minaret clock tower, constructed of hard-pack, molded synthetic carbon nodules in full compliance with the Rock and Soil Conservation Act of 2038. Isla Lyddle End is only a 40 minute fan boat ride from Paddington Sea Station. Bring your Wellies! Isla Lyddle End is well-swamped twice a day, and near coastal areas submerge at the day's first tide.

Speculative modeling and speculative design are practices that create for the purposes of reflection and conversation. Things are made — objects, films — anything really that can provoke the imagination and extend conventional wisdom into new considerations that are unexpected or counter to prevailing.

Russell Davies initiated a collaborative speculative modeling enterprise recently in which he wondered about the future of a town called Lyddle End, a model railroad town. Lyddle End is a fictional world created by Hornby, a toy manufacturer specializing in model railroad props and set pieces. [<http://cli.gs/89sLSu>]

On his blog, Davies proposed the following:

*..an idea for another silly project; speculative modeling. How about I get a load of Lyddle End properties and we try and build a version of what we think Lyddle End might be like in 2050? Everyone who wants one gets a little building and they have to alter it, mod it, change it, play with it, to reflect how they think the world will be in 42 years time. Then, we'll put them all together, either physically or through the magic of photography, and see what it might tell us about our visions of the future. I can't help thinking we might be able to build ourselves a rather intriguing speculative diorama.* [<http://cli.gs/SuyE7J>]

The result was a variety of playful, considered — and quite unexpected musings on what a small town world might look like in 2050. Each one contains its own story about how Lyddle End got there. The speculation and open-endedness allows for creative hyperbole. The story as much as the modeling — the making and crafting — produces the opportunity to imagine while making material instantiations of one's imagination.

Lyddle End in 2050 is an unfolding documentary containing the designed speculations about a transformed world — or a little corner of it — the results of much larger changes and their implications for a small, altered town. The continuing future drama can be found on Russell Davies Tumblr blog at this uniform resource locator:

[<http://cli.gs/MVqBmY>]



In “Death Star over San Francisco” Filmmaker Michael Horn employed desktop video editing software and a scrappy DV camera to materialize his imagination of a San Francisco in which “Star Wars” cultural objects have come to live amongst the quotidian, everyday experiences of its residents. What makes the short film particularly compelling is the matter-of-fact way in which familiar ships and vessels live-within. Rather than over emphasizing the effects, the film’s texture is quite vernacular. There are mundane conversations having nothing to do with the spectacle of a the Death Star hovering overhead, joggers casually exercise along the beach as Imperial Walkers survey the landscape, perhaps themselves out to enjoy the ocean breeze and to cool their heels in the surf.

This kind of imagination speculation creates a context for thinking about different kinds of future worlds. “Death Star over San Francisco” speculates about a possible world expressed as fan art. I can imagine other kinds of visual speculations that help ask questions or provide stories around which conversations about near future worlds. [<http://cli.gs/mmBtgN>]





A fabbed object that emits soothing warm, colors when it is held in the warmth and touch of your hand. But, it must be calmed. At first, it's quite anxious, like a child that needs to be calmed and relaxed. The iterations on the design and the motivation were all ways that we in the laboratory discussed calming, patient artefacts. What might be the social objects in the future that we gather around us to help anchor hectic lives? A rosary? Worry beads? A favorite, smooth piece of blue sea glass? A bit of soft yarn to twist in your pocket?



# 04

## FICTION FOLLOWS FACT

### *Minority Report* and the diegetic prototype

There's a scene in the film *Minority Report*, which also happens to be a wonderful prototype of a ubiquitous computing future, in which Tom Cruise's character Inspector John Anderton manipulates a database of sound and images that are from the near future. In this scene, which just about everyone in the world knows about, Cruise's character makes orchestra conductor-like gestures, summoning and juxtaposing fuzzy snippets of what is almost about to happen. It's all happening in a mad-dash effort to piece together a puzzle. The puzzle is, of course, unlocking the mystery of a murder we know will take place, unless the clues of its location and perpetrator are discovered.

Unfortunately, there is no easy way to share this segment of the film,

which I show when I present this material as a lecture. If you have the film, pop it in now and just watch until around time code mark 4:22. [<http://cli.gs/p4X92W>]

The example I bring up here is, of course, the gesture interface that Anderton uses to piece together the clue fragments for the future murder he is investigating. As a film element, it has a well-balanced mix of visual dynamics that will keep today's science fiction film audience riveted, and legible interaction rituals that allow the audience to follow the gestures closely to develop an understanding of precisely what is going on — what is being manipulated and how bits of clue are juxtaposed and re-arranged as one might do so with a puzzle. Special attention is placed on the precision of the gestures that Anderton uses in order to manipulate the fragments of video and sound — zooming in on a bit of imagery with hand-over-hand gesture; deleting a few things by moving them with a forceful and dismissive sweep into this interface's version of today's user interface trash can.

This sequence, which begins at the very start of the film and continues until 4:22, presents a compelling extrapolation into a near future world. It does much more than demonstrate some bit of technology, relying less on the object and more on its situatedness in the world of human social life. The sequence tells a story, helping to move us from our present and what we know about the world, into the year 2054, a possible near future. The extrapolation from today into 2054 happens in just under five minutes, and it does this without fetishizing the device or the technology too much. Rather, more convincingly, we are led through a bit of convincing human drama, something particularly timeless as murder, law and order, and justice.

There's more than the clue-construction device that Anderton uses — whatever its called. It would be a simple matter to show a few still images from this sequence as an index to the small bit of argument I'm presenting. But, it is precisely this longer bit of story that I want to highlight, and not just the instrumental technology. Not the story itself — the pre-murder. Rather, I want to highlight what the story does so as to fill out the meaning of the clue-construction device, to make it something legible despite its foreignness. It's a device used to edit sound and images somehow extracted from the future. It's as if the story is sharing with the audience, who may be reasonably wondering — *how do you edit and manipulate fragments of sound and images from the future? How does police evidence gathering work in the year 2054, when evidence is things that have not yet happened — but*



*will? Do they travel into the future through some device and collect things that they bring back? Do detectives still use little baggies and tweezers to collect scraps of bone fragment, sending them to clever forensic scientists back at the lab?*

No, of course not. Or not in this possible future. In the speculative near future Department of Precrime, evidence is a story, pieced together through these extracted fragments from the near future.

This is a bit of visual storytelling that is done carefully in science fiction. In the best instances, it does not happen by merely pointing to a prop and saying to the audience didactically — *this thing will show us the future*. A story is told, with images because it's a film, that provides a point of entry for the further development of the plot. It usually happens rather early, so as to lay the groundwork and make it possible for the audience to imagine that whatever unusual, unexpected thing has happened in the future to create the drama, it makes sense because it's been explained, often through extrapolations of science speculation from today.

Whereas “design” might typically highlight the object itself, outside of its dramatic context — perhaps the special interface gloves and screen floating in 3D CAD space — by introducing the drama of this moment I mean to reveal the advantages of attaching “fiction” to the design, filling the object with a meaning and a context that it would never really have sitting by itself on a photographer’s silk pillow, demonstrating its vague, latent power absent its engagement by people and their practices. We can put the designed thing in a story and move it to the background as if it were mundane and quite ordinary — because it is, or would be. The attention is on the people and their dramatic tension, as it should be.

Perhaps 4:22 is a bit long — I don’t think so. It allows the design fiction to tell a story that is broader than the instrument itself. This is what design fiction is about. You don’t fetishize the instrument; rather you emphasize the rituals and the drama — the social elements that stories are always about. The audience wants to know what this thing is in the context of a story in which people — people in the year 2054 — routinely (lets assume so) operate machines to do their work using gestures such as this. Were the instrument itself shown alone, it would appear meaningless particularly if there were no story to surround it. This is a bit like the product design presentations that show the object in a featureless, white CAD backdrop, as if

people use their blenders and motorcycles in featureless 3D landscapes.

What is it about this sequence that should be highlighted? Is it just the gestural interface? Not exactly. If that were the only matter that concerned us, showing stills might suffice rather than watching over four minutes of film. Stills by themselves would remove the dramatic context. We’d have to fill in some gaps, explaining what this guy is doing, perhaps by gesturing ourselves, or using descriptions such as “its like.” and then adding in the story ourselves, explaining that he is doing a future form of detective work, manipulating these images from the future. And the questions would be raised, such as — *“Images and sound from the future? What are you talking about? How do you get images and sound from the future?”.. “Well, there are these evolved humans, they’re sort of these biological technical devices floating in a kind of nutrient rich slurry, and they can see into moments of the future where crime occurs and then send those images from their mind into the apparatus that use manipulate using gestures”.. “C’mon..I don’t get it..”*

And so on.

Finally it becomes apparent that its just easier to show a broad sequence and introduce the story with a little bit of action, some didactic anchorage that explains what’s going on without being as heavy-handed as a documentary. And then it becomes apparent that the capability to tell stories — even visual stories — about what you’re imagining offers a richer way of materializing these ideas, and circulating them. Providing a broader context by moving the instrument into the background, and bringing people and their stories into the foreground provides a more effective, compelling fiction. This bit of design fiction extrapolates and “designs” a future fictional world with some speculative technological instruments, but mostly through a visual story by Steven Spielberg and Philip K. Dick.

I tell you about this four minute sequence in the film not because I want to discuss the story *per se*. I want to unknot a small tangle of activity that is precisely what I mean by property swapping — the action by which the science of the film swaps back and forth between fact and fiction.

Science fact and science fiction jump through each other’s hoops. What I want to do is follow just a small bit of this tangle of conversations and objects and ideas between Philip K. Dick’s short story *“The Minority Report”* through to the Steven Spielberg production of a film based on the story. In between are the activities of scientists in their labs, conversations with



film directors and props makers and experts on the future, back through to special effects artisans working in their shops with their film production software. Following just a few of these linkages shows how easily science-fact and science-fiction swap ideas, properties and objects.

Science-fact and science-fiction are entangled in the *Minority Report* drama, which isn't a bad thing. In fact, it should happen more. Science-fiction has way more imagination than science-fact and almost certainly circulates knowledge and ideas more effectively than all the science journals and science journalism in the world.

In the production of *Minority Report*, the idea for such a gestural interface came from somewhere and at least in part from the film's technical consultant, John Underkoffler. Underkoffler was a member of the Tangible Media Group at M.I.T., and had participated along with a panel of luminaries in providing some speculations as to what the future of *Minority Report* might be experienced based on their insights and their extrapolations of the current trends in the technology world. [<http://cli.gs/V05SSN>] What was needed were some projections to help trace a vector from the present to the future of 2054, when the film takes place.

From a project at the Tangible Media Group called "The Luminous Room" were a number of "immersive" computing concepts that were drawn from some of the principles of Ubicomp. The principles are related to the idea that computers might become more directly integrated into the architecture of the environments that people occupy. Rather than manipulating them with a keyboard and mouse, people might use gestures for direct input.

Translating laboratory principles into a dramatic film allows for the lab ideas to circulate in a bold fashion, beyond what would be accepted in the typical, conservative research-academic-industrial context. There is a larger military-industrial-light-and-magic complex in effect here, which is precisely the larger, messy tangle through which fact and fiction become indistinguishable through a blend of science and entertainment. The action is a kind of science fact-fiction work that effectively tries out some ideas within a film's narrative. It's sort of like prototyping — sketching out possibilities by building things, wrapping them around a story and letting them play out as they might.

More formally, this is what David A. Kirby calls the "diegetic prototype."

[David A. Kirby, "Future is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-World Technological Development" forthcoming in Social Studies of Science, a journal.] It's a kind of technoscientific prototyping activity knotted to science fiction film production that emphasizes the circulation of knowledge and ideas. It is like a concept prototype, only with the added design fiction property of a story into which the prototype can play its part in a way different from a plain old demonstration. The prototype enlivens the narrative, moving the story forward while at the same time subtly working through the details of itself.

The diegetic prototype refers to the way that a science fiction film provides an opportunity for a technical consultant to speculate within the fictional reality of the film, considering their work as more than a props maker or effects artist creating appearances. The diegetic prototype inserts itself into the film's drama which activates the designed object, making it a necessary component of the story. The film itself becomes an opportunity to explore an idea, share it publicly and realize it, at least in part and with the consistency necessary for film production rather than laboratory production.

*..scientists and engineers can also create realistic filmic images of "technological possibilities" with the intention of reducing anxiety and stimulating desire in audiences to see potential technologies become realities. For scientists and engineers, the best way to jump start technical development is to produce a working prototype. Working prototypes, however, are time consuming, expensive and require initial funds. I argue in this essay that for technical advisors cinematic depictions of future technologies are actually "diegetic prototypes" that demonstrate to large public audiences a technology's need, benevolence, and viability. Diegetic prototypes have a major rhetorical advantage even over true prototypes: in the diegesis these technologies exist as "real" objects that function properly and which people actually use." [Kirby]*

In Kirby forthcoming essay he describes Underkoffler's role as a technical consultant where he ..treats his diegetic prototypes as if he were designing not only physical prototypes but real world objects that are a part of "everyday life" in the diegesis [of the film.]" [Kirby]

In the particular case of *Minority Report*, Underkoffler participated in a three-day pre-production conference convened by Spielberg, in which the director brought together smart, forward thinking people to speculate about



life in the year 2054. Underkoffler saw this as an opportunity to channel technical knowledge in a new way, using film as a way to articulate his imagination, trying out some ideas with the backdrop of the film's production. Laboratory production and film production get to swap properties.

The film becomes an opportunity to create a vision of the future but, perhaps more important, to share that vision to a large public audience. In specific cases, such as the evocative "gesture interface" concepts Underkoffler introduced into the film's story and its production design, ideas gather a kind of knowledge-mass. They become culturally legible and gain weight and currency. We "get" the idea of using conductor-like gestures to interact with our information technology because it is given to us through the film, it's pre-science, the discussions that evolve in media and with friends, the formation of companies to further develop the ideas, bolstered on the cultural literacy with touch and gesture interactions, and so on. To gain cultural legibility takes more than a scientist demonstrating an idea in a laboratory. What is needed is a broader, context — such as one that great storytellers and great filmmakers can put together into a popular film, with an engaging narrative and some cool gear.

The follow-on to this science fiction film introduction of gesture interfaces to a large public audience are more gesture interfaces, each one staking out *Minority Report* as a point of conception, either explicitly or implicitly. It's as if *Minority Report* serves as the conditions of possibility for more and further explorations of the possibility for gesture interaction — whether touch-based gestures, as in the Apple iPhone and other techniques, or free-space and tracking gesture interactions, like the Nintendo Wii, for example. This is not precisely the case: we are not interested in claims as to priority, ownership and who did what first. What is much more interesting is the brocade of activity that weaves in and through the fictional/factual special effects props of *Minority Report*.

The entanglements amongst science fact and science fiction is perhaps best summarized with the networked culture digital looming device — Google. Searching across Google's database for "Minority Report interface" reveals most plainly the property swapping gymnastics of this bit of science-fact-science-fiction. Search results present us with stills from the film right next to things that look like DIY garage science projects, to demonstrations of touch panels at industry trade shows like TED and CeBIT, to reviews of the iPhone interface using *Minority Report* as a point of reference, to promises

that the *Minority Report* interface is just around the corner — wherever that corner may be. One can quickly trace the dynamics as the science fiction of the film swerves into a series of science fact developments that are inextricably knitted together, whether the facts or the fiction care. It goes on and on, and through it all, just a step back from the specific "results" is what I mean by the entanglements where science fact and science fiction swap properties.

This isn't to say that *Minority Report* serves as the canonical origin story for gesture interaction, but it certainly is a powerful, gravity-like force providing a reference point through which science fact and science fiction swap properties and become partners in their own exploration of possible futures. The film is what gives some sense to a curious speculation that says, *in the future people will be flapping their arms around to interact with computers*.

In fact, it ends up that somehow this idea makes enough sense for it to spread outward, beyond the film itself into other experiments, and (inevitably) commercial endeavors. A mentioned, the Nintendo Wii comes to mind, but there are others, depending on which communities and networks of ideas one circulates amongst. It even becomes one of those rare speculations that can gain some time on a national news broadcast. So long as it can provide an anchor for an audience to this popular film, it becomes "legible" as an opportunity for a bit of light news. It is this example as seen in a short bit of CNN news candy [<http://cli.gs/TZ4tzG>] that perhaps speaks most directly to the possibilities of the design fiction principle that we should create inextricably tangled weaves of fact and fiction.

Over a few years we see a variety of variations on a theme, which is not to say that *Minority Report* started it all in any kind of essential, definitive way. What is intriguing is to consider the circuits by which ideas and their materialization and their circulation back to the world of re-considered ideas rely on larger cultural imaginaries to provide necessary contexts and meanings. It's not just "science", it's also the ways that the science is framed and given meaning. We need our metaphors — they provide anchors for thought and reflection and motivation for creating new things. Design fiction is a way to work on and refine these object-ideas, particularly as we consider them to be important transition points towards new, more habitable kinds social worlds.

Remember, this is a kind of knowledge-making work. It's good, playful work to think about how such a gesture interface might operate, and how it



expands upon or even disrupts existing interaction protocols. For the filmmakers who are more attentive to the story, what the design-fiction production team cobbles together is valuable to the extent that it helps move the story along without drawing too much attention to itself. (In a minimal case their work may even perform the role of the “MacGuffin” famously deployed by Alfred Hitchcock. The object need not have the same depth of possibility and consideration that the *Minority Report* interface device has. It need only be there, as an element that moves a story forward without any extensive, fleshed-out details of operation. It could in fact be the vaguely specified but full-of-meaning device often used in technothrillers, often having the power to entirely re-imagine the future for the worse, and usually simply called — “the device.”)

*Minority Report* shows how science fiction is shaped and informed by science fact. It also shows how science fact learns from and finds inspiration through the science of fiction. Practitioners (film production people, scientists) who stake a claim along either side of the science genres come together to participate in the action of turning ideas about the future into a visual story containing ideas about the future.

There are other frameworks for the production and circulation of ideas, things other than a high-budget film with fancy effects tools, toys and creative talent. It just as well may happen from the other side of the imaginary fact-fiction continuum. The initial impulses may very well be biased toward the creation of the more fact-based kind of science — the kind that may enjoy a good science fiction film but take that as entertainment more than a reference to anything real and possible to create in the laboratory. This is perhaps the more familiar road to materialization. You take an idea based more on its ability to become an object containing a value proposition that yields a more or less good chance of producing a positive balance called profit. We’re less interested in those, because those kinds of ideas necessarily filter out provocation way more often than not.

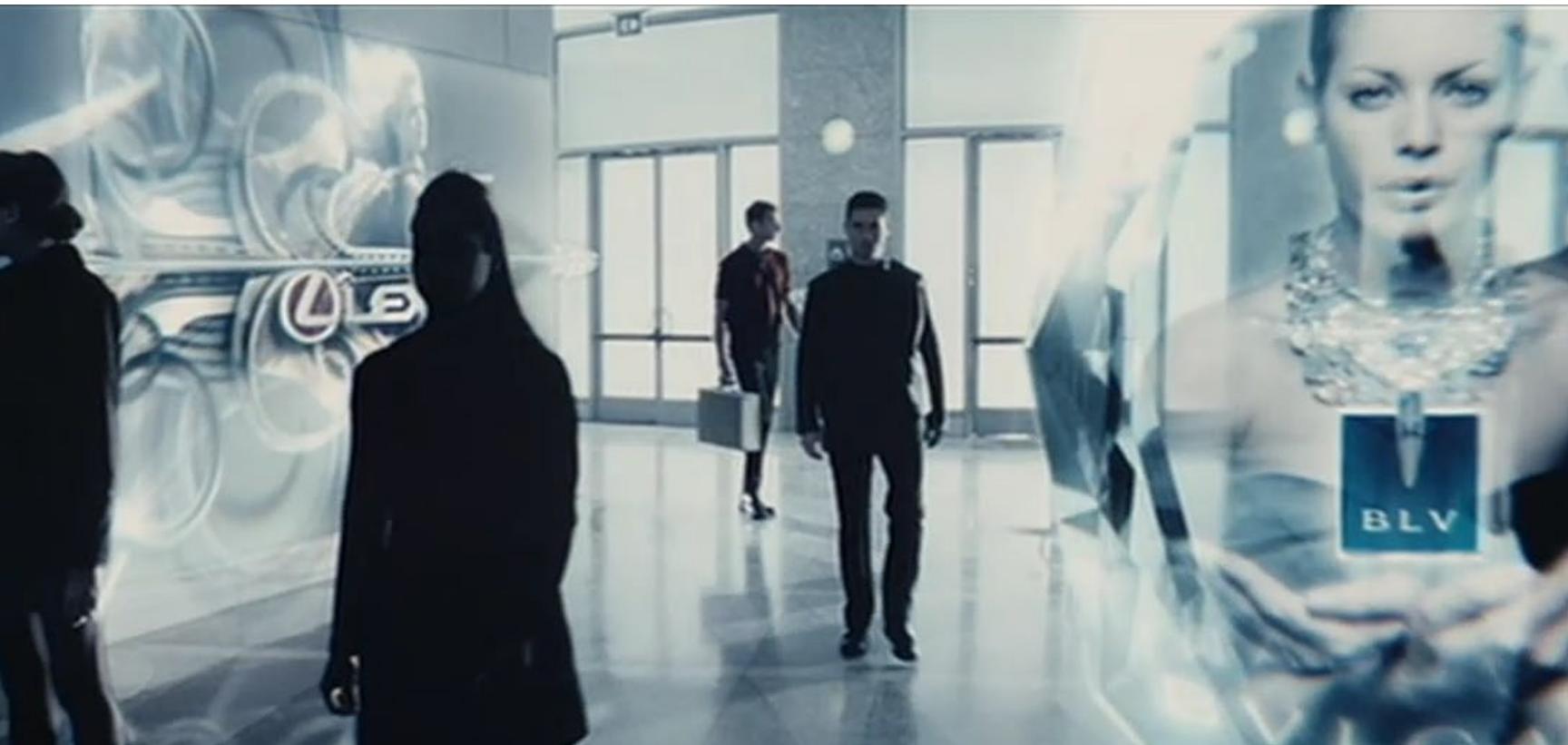
In this case, with the bias on doing “real” science — no one’s really being fooled into thinking that things like gesture interfaces of the sort one sees in *Minority Report* are something you can get and play with in your living room. Except — hold on. Yes, you can. The design fiction of the film probed the possibility spaces of this new, curious kind of interaction ritual, activating further consideration and design work and refining the concept into something that holds itself together for another context, one other than

film production. We begin to see living room entertainment with game consoles, or smaller-scale gestures with MP3 players and portable telephones, or coffee tables with screens built into them. It’s as if on some level *Minority Report* holds some stake in creating the conditions of possibility for such things, producing the cultural imaginary that makes such things have some legible context. *Minority Report* is not on its own in doing this, certainly. It’s not a game of who was first, although there are plenty of people who spend their time prioritizing who-was-first, arguing as if they were still on the schoolyard playground. There’s far too great a muddle of activity to delineate a clear order of things and, besides, that’s not as interesting as enjoying the confusion.

We just looked at the science fiction side of things, where props collapse and knot together in the activity of prototyping, thereby circulating ideas and encouraging further material production outside the context proper to the fiction. Now let’s look at things from the side of the science of facts, and investigate how matters-of-fact knit into matters-of-fiction. In this case, a science indebted to fiction called Ubiquitous Computing, or Ubicomp.

Ubicomp has a curious relationship to science fact and science fiction. It is a science fact, the kind practiced by thoughtful experts with advanced degrees and corporate budgets to build peculiar devices that explore the future ways in which we may interact and communicate with one another, or with our kitchens or with the most quotidian of things like door knobs and vacuum cleaners. Because of the way Ubicomp focuses its attention on the everyday and routine, it is as much a science that tells stories about what a possible future world may look like and how we live within it, as it is a science that creates technical specifications and patentable intellectual property. As we’ll see next, Ubicomp seeks to refashion the entirety of the relationships amongst people, what they do, how they do it — all through new kinds of networked, computational devices.

In the section that follows, I will introduce Ubicomp as an example of a design fiction — a hybrid of science fact, design and science fiction. In contrast to this section where fiction collaborates with fact, the next section explores the way that science fact collaborates similarly, revealing the way that science fact is also a kind of science fiction.



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Web Images Video Results 1 - 10 of about 337,000 for [minority report interface](#). (0.10 seconds)

**Image results for "Minority Report Interface"**



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Natural Interaction Research  
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[naturalinteraction.org](http://naturalinteraction.org)

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10 min - Aug 6, 2006 - ★★★★  
Minority Report interface prototype - Added. 1:51. Minority Report interface prototype. 74206 views. alevalli - Minority Report at CeBIT 2008 ...  
[www.youtube.com/watch?v=PLhMVNdplJc](http://www.youtube.com/watch?v=PLhMVNdplJc) - 

[YouTube - Minority Report interface prototype](#)  

  
1 min 51 sec - Jul 12, 2006 - ★★★★  
Interactive wall. <http://naturalinteraction.org>This is done for casual users in public spaces, where interaction is rather short (seconds? a few minutes?).  
[www.youtube.com/watch?v=v=3bn-zZX9kdc](http://www.youtube.com/watch?v=v=3bn-zZX9kdc) - 

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[flowingdata.com/2008/11/17/minority-report-physical-interface-in-real-life- oblong-g-speak/](http://flowingdata.com/2008/11/17/minority-report-physical-interface-in-real-life- oblong-g-speak/) - 32k - [Cached](#) - [Similar pages](#) - 

[Minority Report-like interface gets demoed at CeBIT - Engadget](#)  

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[www.engadget.com/2008/03/11/minority-report-like-interface-gets-demoed- at-cebit/](http://www.engadget.com/2008/03/11/minority-report-like-interface-gets-demoed- at-cebit/) - 126k - [Cached](#) - [Similar pages](#) - 

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[blog.wired.com/gadgets/2009/01/video-toshibas.html](http://blog.wired.com/gadgets/2009/01/video-toshibas.html) - 75k - [Cached](#) - [Similar pages](#) - 

**"Minority Report" at CeBIT 2008, the actual movie (2002), and a touch screen company that makes touch interaction surfaces and its own olive oil and has purchased the Google keywords for minority report interface so their ad and video appears on the results page.**

**"Minority Report" at TED 2005**

**"Minority Report" Interface Prototype, circa 2006**

**"Minority Report" at TED 2009**

**"Minority Report" by g-speak**

For things that become Minority Report-like, Google effortlessly shows the fabric that is their interwoven references and swirls amongst the core concept. Air quotes, “reality” and “-like” are the tell-tale signs of similarity, indexicality and self-reference. This is the texture of imbricated associations amongst fact and fiction. The cultural legibility of “Minority Report Interface” [<http://cli.gs/2YjzUN>] owes as much to the science fiction of the search term as to its science fact. The film had production design and technical design assistance from engineers who had been — and go on to involve themselves with — the “reality” of this sort of interface. It’s not a chicken-or-egg problem, and the questions are not about “primacy” or who-did-what-first. Those are silly, except for bothersome precedence hooligans of the intellectual property world. What matters is the mutual activities, the back-and-forth and the evolution of curious new ideas into larger cultural imaginaries.



CNN Reports [<http://cli.gs/TZ4tzG>] on the “fact” of the Minority Report fiction in a segment of reporting on John Underkoffler’s intriguing, continued material speculation on the Minority Report interface he conjured for the film’s production. This time it is through technology he and his colleagues are constructing, which they call “g-speak.”

This CNN segment captures the swapping back and forth between fact and fiction with no irony whatsoever, which is reason enough to take seriously the possibilities of blurring the boundaries in productive ways.

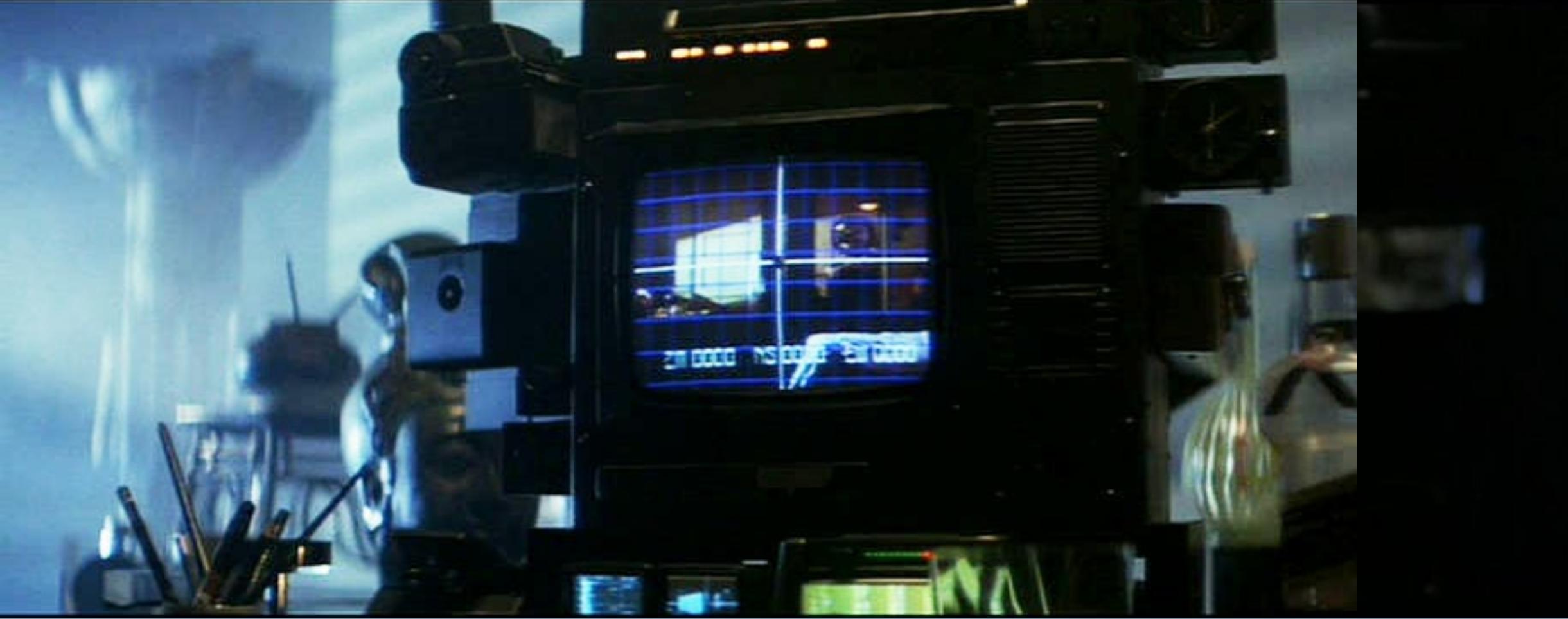
In this short report we see the way an entanglement of ideas can slip and slide amongst fact and fiction so effortlessly as to effectively blur the boundaries. The film becomes a means to circulate the idea of an evolved computer-human interface (which may or may not be “better” than today’s — no matter, so long as it has disrupted convention. We here are not only focusing on things that become commercial hits and make investors their fortunes. We are tracing the knots and entanglements by which ideas become their material counterparts, and material fold back onto continuing imaginaries.)

In 2002, *Minority Report* was released, which we may describe as the diegetic prototype for the gestural interface concept. In this segment, CNN reports on the real-world prototype in the year 2005. The following years trace a knot of interpretations and reflections as the idea of a gesture-based interaction circulates and gains “idea mass” — the “Google” of “*Minority Report Interface*” [<http://cli.gs/2YjzUN>] indicates the breadth of interpretations and the notion that moving ideas to their materialization can happen through the lens of fiction.

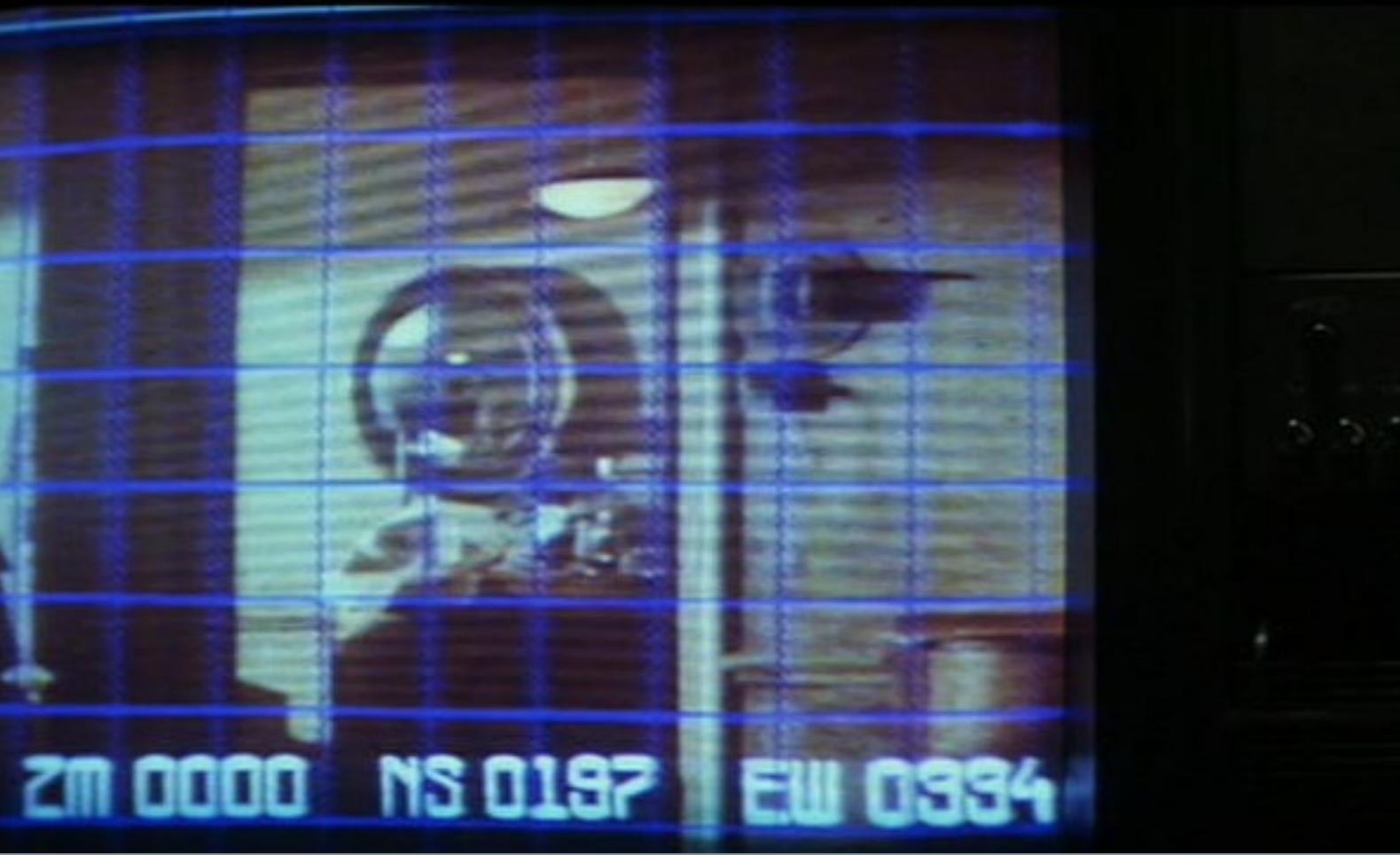


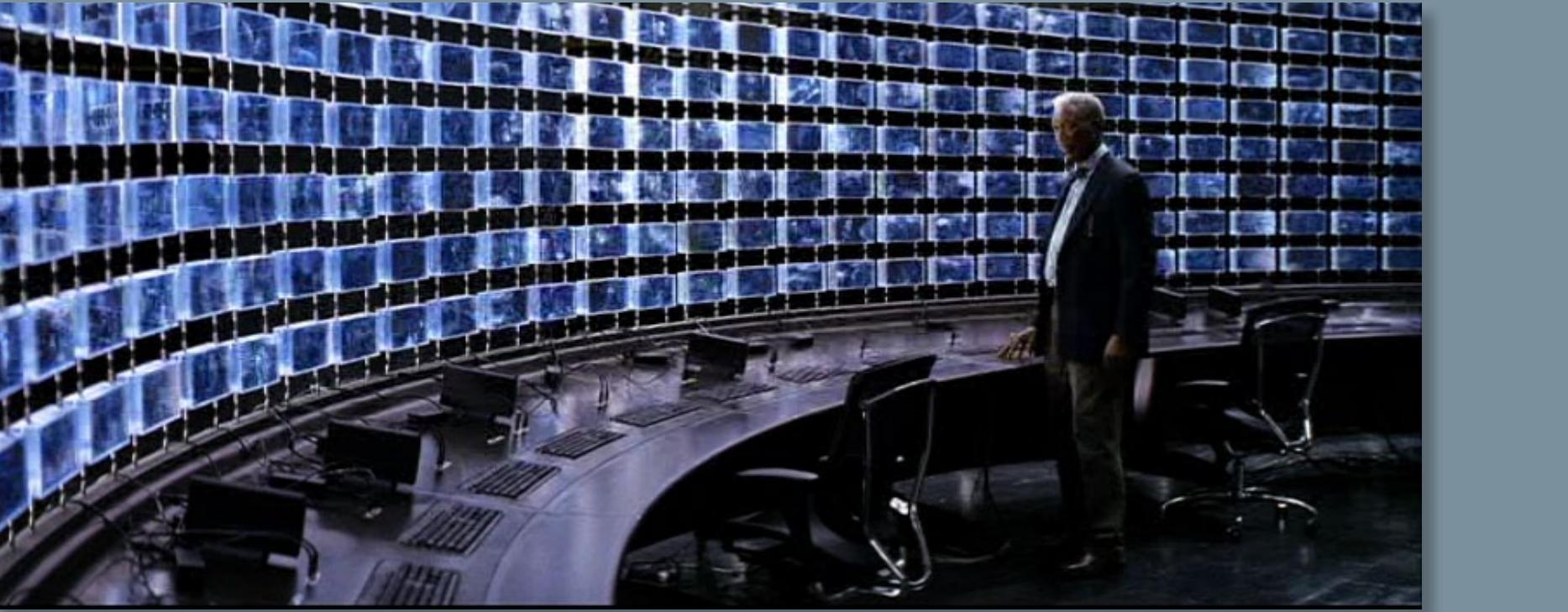
Sascha Pohflepp's "Blind Camera", a functional device designed and built to speculate upon the evolution of "taking photographs" and the interaction rituals that obtain therein. Pohflepp's camera has no lens but captures other peoples' photographs that were taken at the same moment that the Blind Camera's button was pressed. Well-connected digital networks, the enormous popularity of photo uploading and sharing means that the Blind Camera can find a photograph that was taken at the same moment by using the time-date data encoded in most photographs. So, at some point, when someone uploads a photograph that was taken at the same moment, it will appear on the Blind Camera's screen for you to see.

<http://cli.gs/9dSp6D>



Blade Runner, a speculation about a kind of near future iPhoto experience for holographic images.  
Ridley Scott. 1982. Blade Runner. <http://cli.gs/XDdLNR>.





Batman: Beautiful, isn't it?

Lucius Fox: Beautiful. Unethical. Dangerous. You've turned every cell phone in Gotham into a microphone.

Batman: A high frequency generator receiver.

Lucius: You took my sonar concept and applied it to every phone in the city. With half the city feeding you sonar you can image all of Gotham. This is wrong.

Batman: I've got to find this man Lucius.

Lucius: At what cost?

Batman: The database is null-key encrypted. It can only be accessed by one person.

Lucius: This is too much power for one person.

Batman: That is why I gave it to you. Only you can use it.

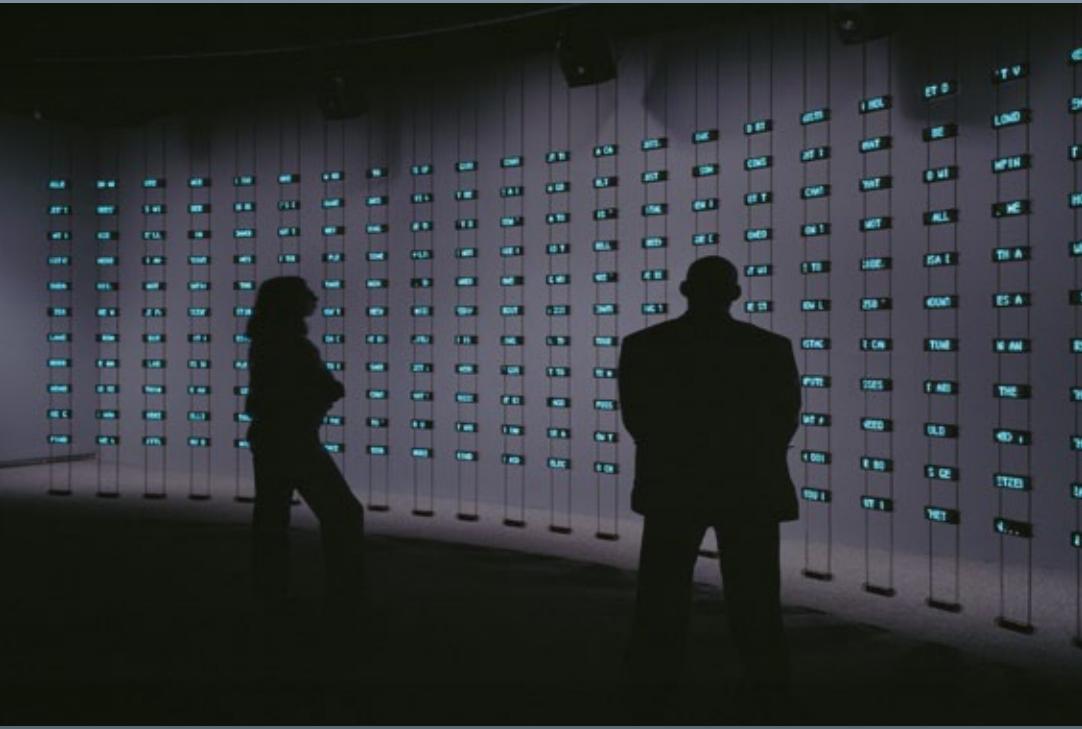
Lucius: Spying on 30 million people isn't part of my job description.

Batman: This is an audio sampler. If he talks within range of any phone in the city, you can triangulate his position.

Lucius: I'll help you this one time, but consider this my resignation. As long as this machine is at Wayne Enterprises, I won't be.

Batman: When you're finished, type in your name.

[<http://cli.gs/GzhJhW>]



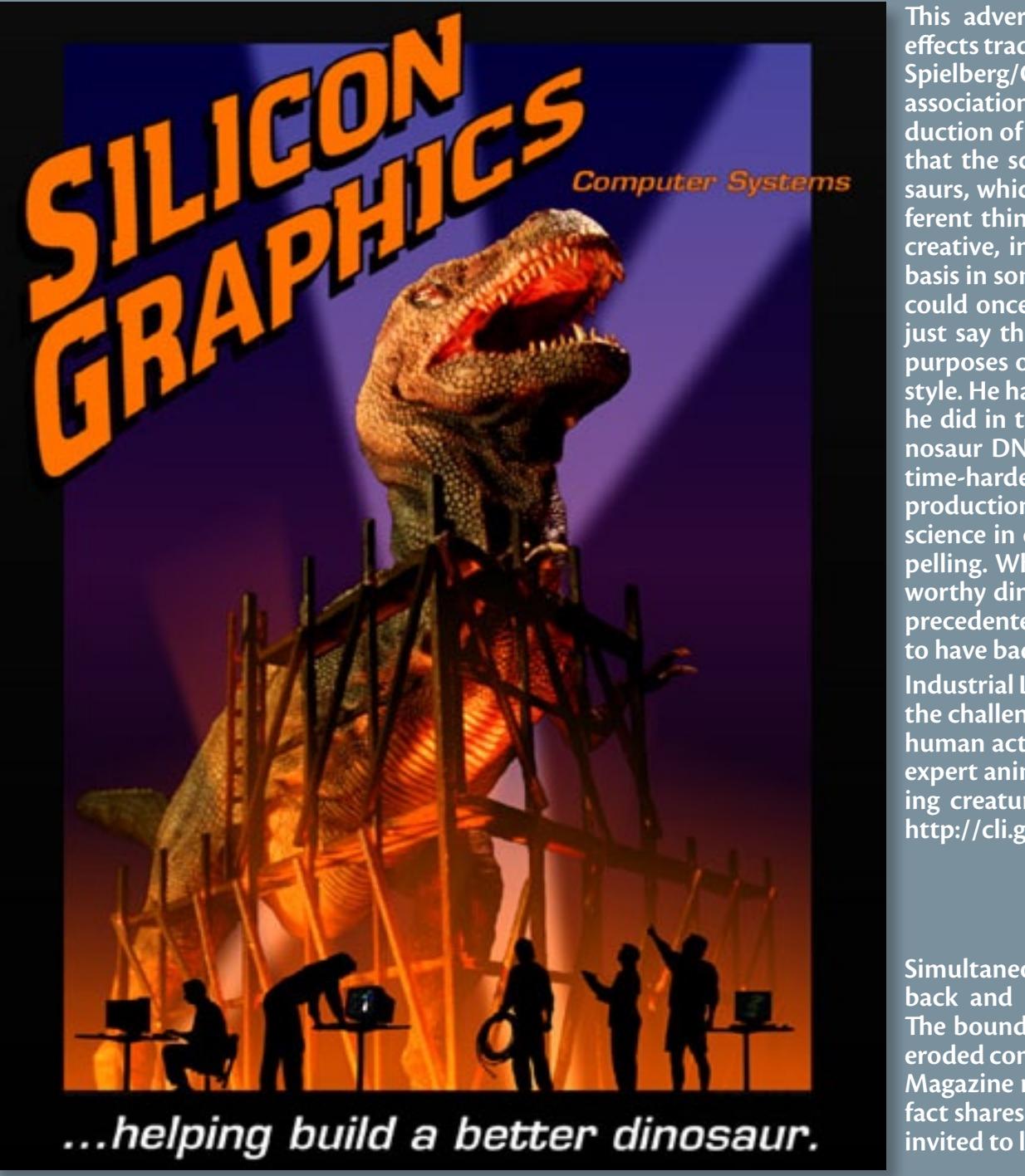
The “listening post” in The Dark Knight serves as much as a story prop that helps move the narrative toward its final, inevitably dramatic finish as it forces a reflection on the ethical dimensions of potential abuses that could arise from ubiquitous mobile telephony. The fact that nearly everyone has a mobile phone that can be tracked and listened to has an ethical consequence that is explored in this particular scene. The design fiction here is to construct a prop that prototypes the ethical dimensions as much as the technical dimensions. This, arguably, is something that could only be played out effectively in a designed fiction, as opposed to a terse technical document.

The Dark Knight device has a remarkable similarity to “Listening Post” — an art-technology project by Mark Hansen and Ben Rubin. The science fact Listening Post is tapped into the public conversations on the Internet, displaying visually and aurally (through voice synthesizers) fragments of conversations and exchanges from anonymous people on the Internet.

The science fiction listening post also listens in on conversations, using the sonar prototype developed by the Lucius Fox character to turn any mobile phone into a device that can “image” (like a ship’s sonar) the world around it. In The Dark Knight, Batman exploits this technology to turn every cellphone in Gotham into such a sonar device, which raises ethical problems for Lucius.

Listening Post, by Mark Hansen and Ben Rubin: [<http://cli.gs/puZArT>]

Listening Post image by David Allison: [<http://cli.gs/yse0EZ>]



This advertisement from Cinefex, a well-regarded special effects trade publication around the time of the release of the Spielberg/Crichton spectacular Jurassic Park makes a playful association with the story of the science fiction and the production of the science fiction. In one instance, we know now that the science fiction of the story is about making dinosaurs, which is one thing to write about, but an entirely different thing to produce as a visual story. The film required creative, imaginative speculation about two things. First, a basis in some science fact as to the possibility that dinosaurs could once again walk the earth. Of course, Crichton could just say this and hope that readers would accept it for the purposes of enjoying the rest of the story, but this is not his style. He had to find some bit of science fact to extend, which he did in the science of genetics and the possibility that dinosaur DNA is somewhere to be found, sealed away in the time-hardened sap of what were once ancient trees. The film production also needed to develop new computer graphics science in order to create dinosaurs that were visually compelling. What were needed were a grade or two better film-worthy dinosaur; something visually spectacular and as unprecedented as the science fiction premise. It would not do to have badly animated or unconvincing puppets.

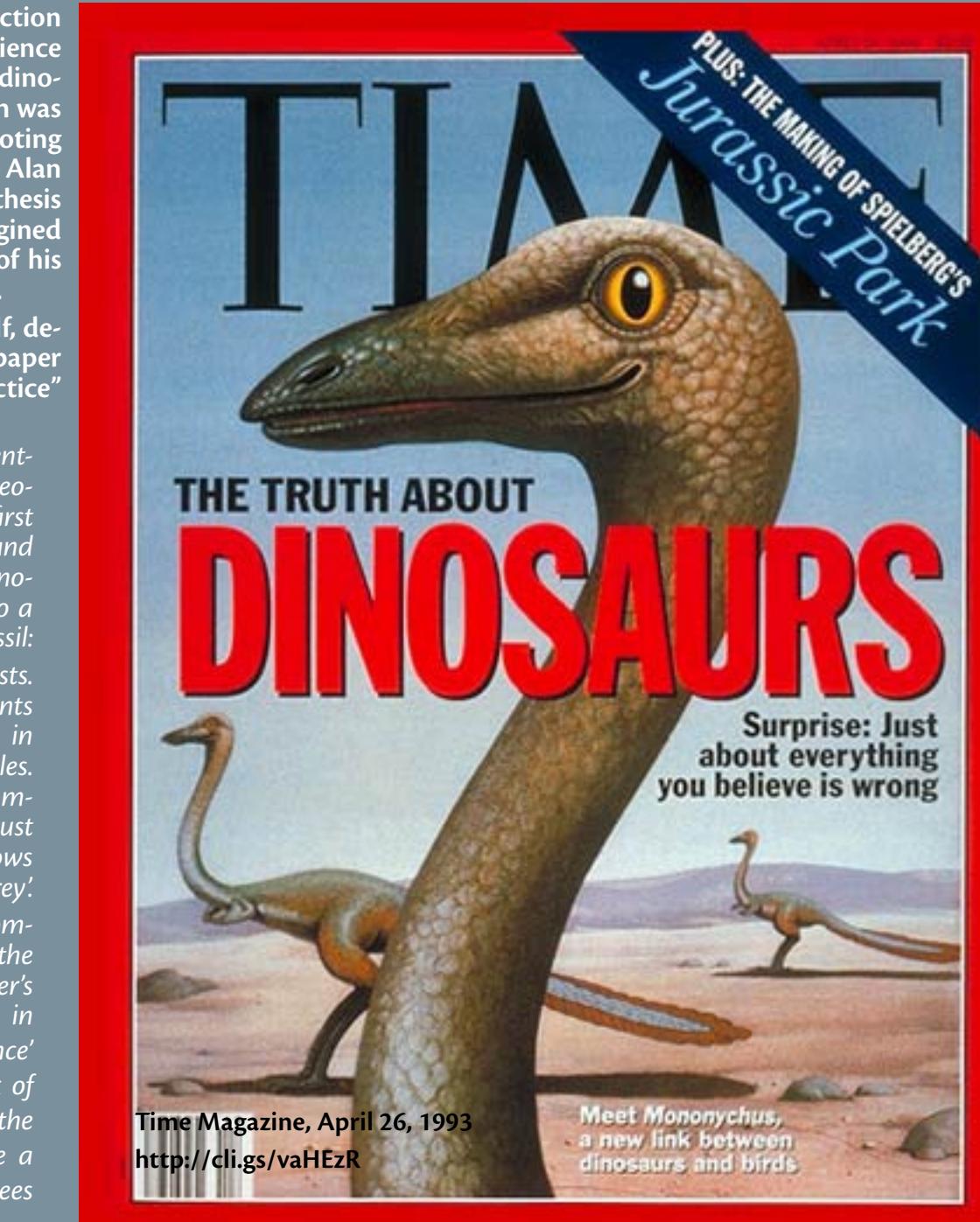
Industrial Light & Magic were summoned and presented with the challenge to create dinosaurs that could live alongside of human actors. A mix of computer-based special effects with expert animatronics were employed to create these convincing creatures. [From "The Reality Effect of Technoscience" <http://cli.gs/SNdMUj>]

Simultaneous with the film were all manner of swerving back and forth between science fact and science fiction. The boundaries between the story, the facts and the fiction eroded completely, which is not necessarily a bad thing. Time Magazine ran a cover story in which the truth of the science fact shares space with the truth of the science fiction. We are invited to learn as much about dinosaurs as possible. On one

end of the learning curve is a lesson about making science fiction about dinosaurs. On the other, is a lesson about making science fact dinosaurs. There are also new speculations about how dinosaurs lived, told simultaneously through the film story, which was based on minority science facts promoted by the self-promoting paleontologist Jack Horner who is depicted as the heroic Alan Grant in the film. Horner, the science fact scientist, holds a thesis that dinosaurs were more bird-like than we might have imagined before Jurassic Park, and the film provides visual evidence of his science fact hypothesis in its didactic scripted science fiction.

David A. Kirby does the job for me better than I could myself, describing this curious imbrication of fact and fiction in his paper "Science Consultants, Fictional Films, and Scientific Practice" [<http://cli.gs/h0Qdts>]

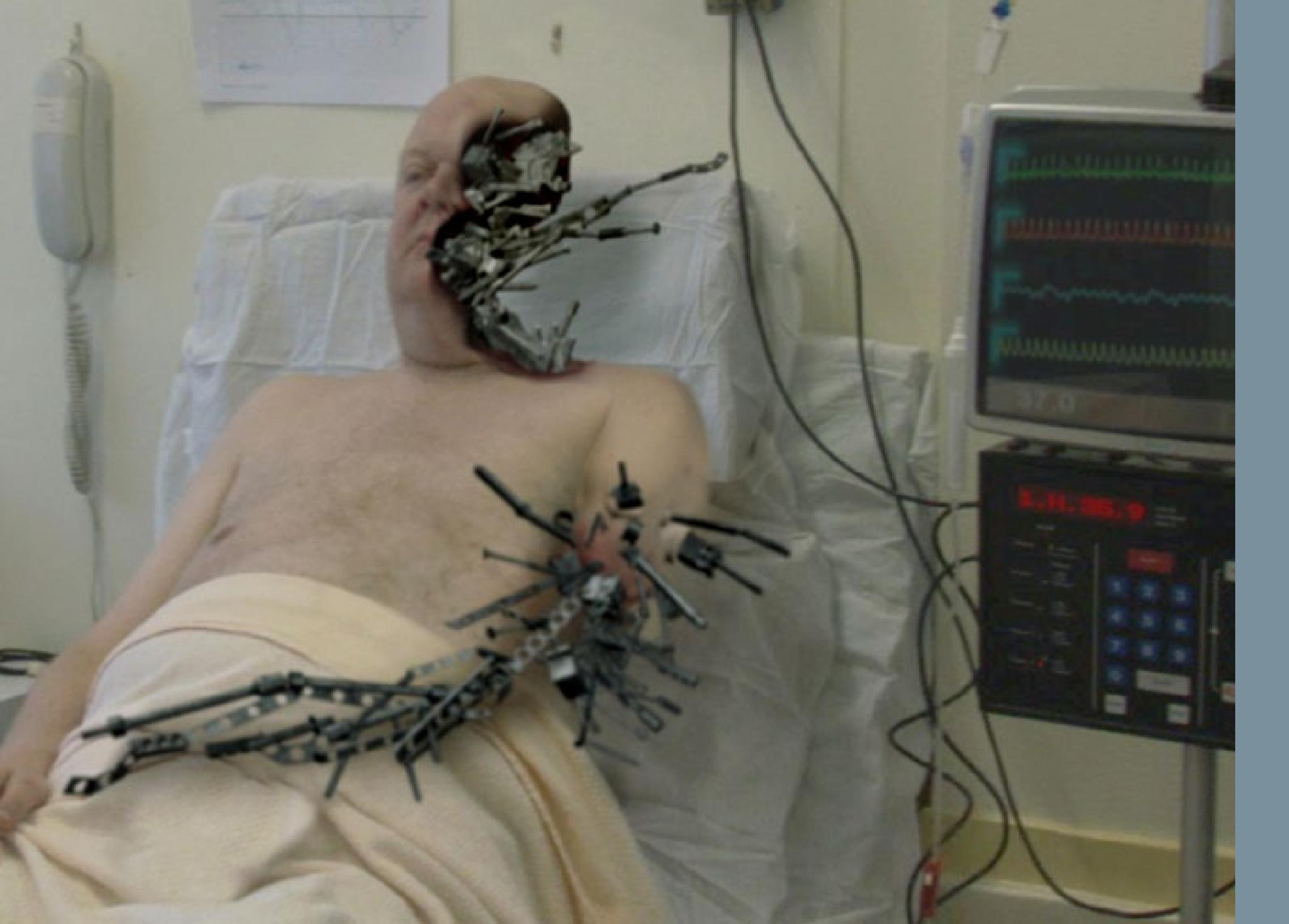
"Throughout the course of the film the audience is presented with visual 'evidence' to support Grant's (i.e. Horner's) theories of a bird-dinosaur evolutionary relationship. When we first meet Grant, for instance, he explains to his field assistants, and of course to the film's audience, his notions of the bird-dinosaur relationship. He backs his explanation up by pointing to a computer screen that visualizes a complete Velociraptor fossil: GRANT: Look at the half-moon shaped bones on the wrists. No wonder these guys learned how to fly. (The field assistants laugh at him.) Seriously. Well maybe dinosaurs had more in common with present day birds than they do with reptiles. (Pointing at the image of the Velociraptor fossil on the computer screen.) Look at the pubic bone turned backward, just like a bird. Look at the vertebrae full of air sacs and hollows just like a bird. And even the word raptor means 'bird of prey'. With the guidance of Jack Horner, the film-makers create a computer-generated image of a 'Velociraptor fossil' that one of the main characters can use as a visual device to explain Horner's theories of bird evolution. There are several other scenes in the film that present the audience with the 'visual evidence' that birds evolved from dinosaurs. In a scene where a pack of Gallimimus run away from a T. rex, Grant exclaims that the Gallimimus move with 'uniform direction changes, just like a flock of birds evading a predator'. Of course, the audience sees





this 'flocking' just as Grant does and Grant's dialogue encourages the audience to 'witness' his interpretation of these actions as well. Other examples in the *Jurassic Park* series of concepts that can be attributed to Horner include the hypotheses that dinosaurs were warm-blooded animals, that they had a communal nature, that *Velociraptor* used sophisticated communication, that *T. rex* nurtured its young, and that *T. rex* was exclusively a scavenger. None of these concepts have a complete consensus in the scientific community and many of them are the subjects of heated debates. However, in the case of the *Jurassic Park* films only one side of dinosaur 'science' got screen time. Scientists who disagree with these depictions have found other outlets to express their notions about 'true' representations of dinosaurs. For example, some of the scientists who visually and thematically 'lost out' have since put together a list reframing the 'science' in the first two *Jurassic Park* films. 'The Dinosaur Interplanetary Gazette' [<http://cli.gs/NHpsXs>] hosts the list and it is a collection of competing paleontologists' alternative beliefs about dinosaurs, labeling Spielberg and Horner's fictionalized science as 'science bloopers'.

From David A. Kirby, "Science Consultants, Fictional Films, and Scientific Practice" [<http://cli.gs/h0Qdts>]



"Metalosis Maligna" is a design fiction documentary that speculates on the possibility that metal implants could produce a peculiar infection, resulting in abnormal metal growth within the body. The speculation is not for the light-of-heart (or anyone with a metal implant.) But, as wonderfully creepy as it is, it raises questions about the proliferation of implants and relationships between purity, hybridity and species transformation. It thinks about a small, imperfect corner of a future world.

Beyond the story itself is the style of the drama. Kaayk presents it in the chaste form of a public television documentary. We follow a doctor/scientist as he puzzles over the medical problem with the appropriate level of concern and detachment. The documentary style completes the design fiction, creating a sense of plausibility. It says, visually — *this could happen*. It is "fiction" to the degree that no such disease called "metalosis maligna" exists, so far as we know. The confusion and muddle arise in the visual mode of the fiction's presentation. It becomes a perfect way of dramatizing an matter-of-concern.

"Metalosis Maligna" by Floris Kaayk, 2006. <http://cli.gs/R3TSSD>

A Botanicalls plant, a fully-functional designed fiction that that speculates about a near future world in which a constructed sentience is given to the companion species around us. Botanicalls senses the ecological state of your plant. If the plant needs watering, it is able to call its owner and say so. It acts as both a simple reminder for those who have trouble maintaining their plants. But, perhaps more importantly, it imagines a different kind of near future world where things like this are routine, assumed capabilities of parched plants, dyspeptic pets and dirty rugs.

Botanicalls, by Rebecca Bray, Rob Faludi, Kate Hartman and Kati London.

<http://www.botanicalls.com>



To talk about how science fact swaps properties with science fiction, I'm going to start with Ubiquitous Computing because it is much more than just an engineering-and-computer-science-fact. Ubicomp lies somewhere in the middle of the science-fact / science-fiction continuum, which isn't a bad thing. It's actually a very creative, productive and exciting positioning. It's creative and productive because Ubicomp people get to make things that have a different in-the-hand kind of tangibility than the story props of science fiction. It's exciting because you can tell stories that are different from the sometimes boring, terse and technical instrumentalities of the normal, engineering sort of science fact.

Ubicomp is a science-fact that has snagged itself between the "here" of

almost-ready-for-consumer-markets and the "out there" of near future speculation. It's somewhere between corporate sponsored research and development, and cyberpunk science fiction. Ubicomp is where you get to work on things that typically only find expression as objects from some science fiction universe. When you work in the Ubicomp field, it's bit like being able to make science fiction fan art — all the cool technologies and concepts that you see in your favorite science fiction — only the fan art is built technologies rather than sketchbook doodles or inert plastic models or wood and Styrofoam props.

In this section I reveal how the facts of Ubicomp becomes entangled with science fiction. At the same time I will show how a blurry boundary between fact and fiction can be creatively liberating, offering opportunities to explore ideas that may be thought about, but rarely explored. Productively confusing science fact and science fiction may be the only way for the science of fact to reach beyond itself and achieve more than incremental forms of innovation. In order to do this I'll be describing Ubicomp because it stands out as an instance of where science fact and science fiction happen simultaneously. It is therefore a good site of knowledge and culture production. It has a lot to say about design fiction practices.

Rather than describing Ubicomp through a history, or a timeline of important projects, or a survey of researchers' biographies, CVs or interviews, I will trace the contours of the field, revealing where it bumps up against science fiction. My reason for doing this is to imply that the interface where science fact and science fiction swap properties is what actually defines Ubicomp, perhaps even more than the actual technical work itself. If we look closely at some of the defining statements of Ubicomp — the words and statements and goals that describe the endeavor — we find some properties that are very closely aligned with the principles of science fiction.

My second reason for describing Ubicomp by looking at the contours of the field where fact and fiction blur is to highlight precisely this property, the way in which Ubicomp activities, concepts, objects and prototypes are simultaneously fact and fiction. As science slides back and forth between fact and fiction, refusing to stick at either end for very long, the properties and cultural effects of fact and fiction swap places. Fact becomes useful as a way to enliven fiction; fiction becomes a useful example and index for describing fact. Ubicomp is a good example of this because this property swapping is so continuous, acting as a kind of defining mechanism. This

# 05

## FACT FOLLOWS FICTION



### Science Fiction, Ubicomp and Design.

kind property swapping is a key feature of Ubicomp. It would be difficult to describe Ubicomp without highlighting this, as would happen if I were to describe it just in terms of its history, or just as a table of important projects, or even stories about the hard work of its researchers.

These places around Ubicomp where it hits the boundaries of science fiction are more than curiosities. They are what give Ubicomp significant, inextricable, cultural meaning. The interfaces are where Ubicomp becomes public, where it gains a kind of everyday legibility that is richer than the terse science fact of technical specifications. The interfaces between fact and fiction define Ubicomp to such an extent that there is no way to ignore, or wipe clean, or avoid the kind of imaginary flights of thought that are part-and-parcel of science fiction.

My point here is nowhere near an indictment. I am not saying — “*Ubicomp, you’ve been fooling yourself into thinking that you are a kind of science fact, deserving of the accolades of that endeavor.*” Rather, what I am highlighting are the benefits and virtues unique to Ubicomp as an obvious hybrid science, an enterprise that can serve as a useful model for other endeavors.

My description of Ubicomp makes plain its relationship to science fiction so as to highlight how science fiction and science fact are knotted together into a mutually reliant assemblage. The example that comes immediately to my mind is the way many of the important principles and examples of the Ubicomp future that were pioneered at Xerox PARC find their finest, most complete expression in science fiction. This is true to such an extent that props in some stories and films like *Minority Report* have become the most legible indexical examples of what Ubicomp is. Science fiction serves as a richer, more complete kind of prototyping technique for Ubicomp science fact than the science fact itself.

What next? First, I will describe the core of Ubicomp through some early statements about its goals as expressed by its early thought leaders. I’ll consider these remarks in the context of how they’ve been expressed in science fiction. Then I will look at those two essays by Genevieve Bell and Paul Dourish that stake out a conceptual contour that puts the science fact practices of Ubicomp alongside of some principles of science fiction broadly. The first essay does this by describing Ubicomp’s relationship to the “near future”, an important conceptual frame for a style of science fiction. The

second essay looks more directly at a kind of cultural legacy which traces many Ubicomp conceptual principles and ideologies back to science fiction television of the 1970s and 1980s.

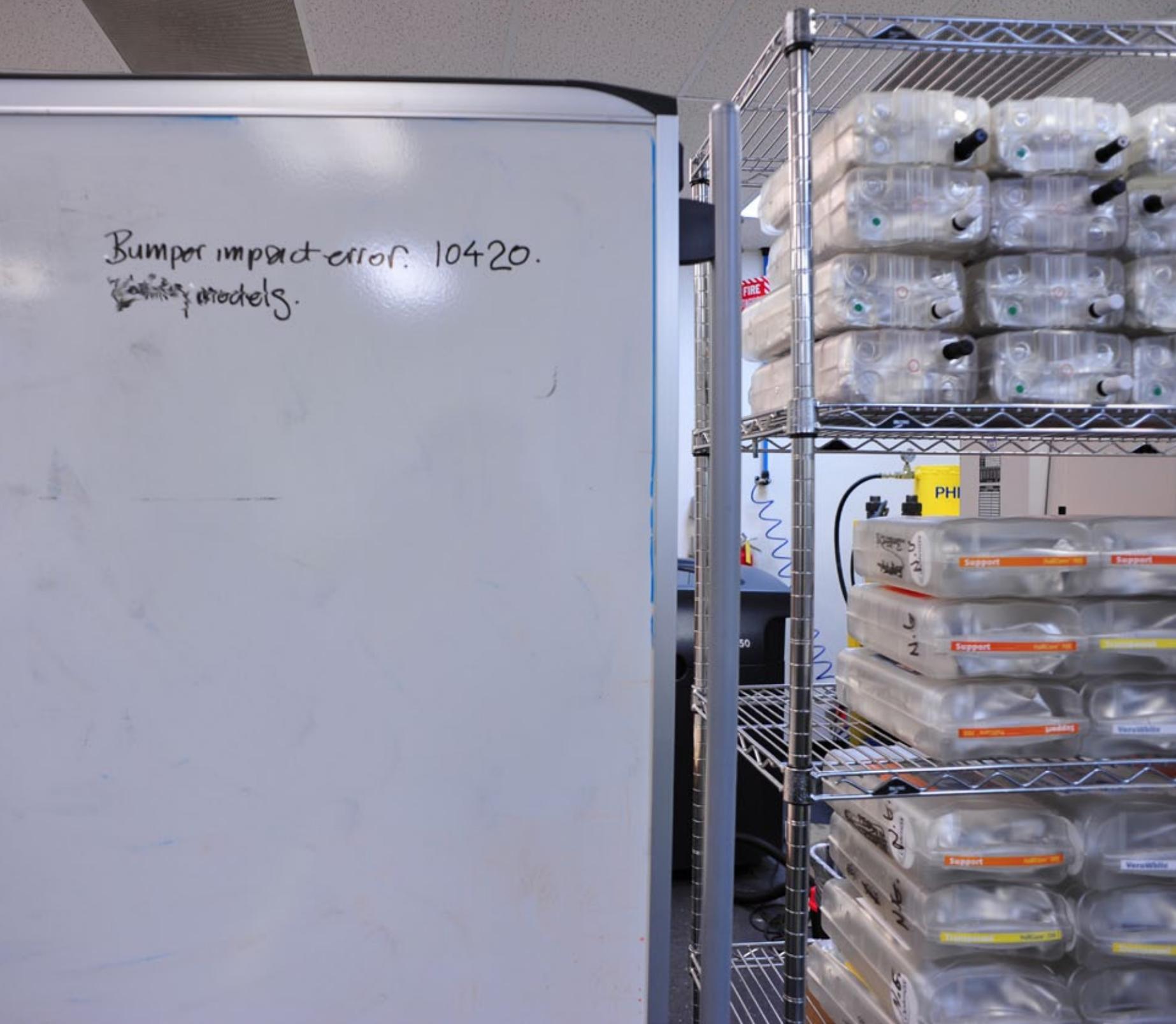
## Ubicomp

Xerox PARC is often credited as the canonical emergence of Ubicomp, this happening around 1988 with the formation of The Ubiquitous Computing program there. As described by early researchers at PARC, Ubicomp was meant to address some of the broad, systemic problems with computers at the time, and which continue to linger to this day.

*“The program was at first envisioned as a radical answer to what was wrong with the personal computer: too complex and hard to use; too demanding of attention; too isolating from other people and activities; and too dominating as it colonized our desktops and our lives.*

*“We wanted to put computing back in its place, to reposition it into the environmental background, to concentrate on human-to-human interfaces and less on human-to-computer ones. By 1992, when our first experimental “ubi-comp” system was being implemented, we came to realize that we were, in fact, actually redefining the entire relationship of humans, work, and technology for the post-PC era.”* [<http://cli.gs/NZhat1>]

What the Ubicomp researchers were involving themselves with was a whole new category of human-computer interface. They weren’t improving keyboards to make them more ergonomic so they would cause less repetitive stress syndrome. Nor were they making computer mice with better tracking so they wouldn’t get hung up on the dust and lint on your desk. Their focus was much broader in that they set upon the task of completely changing the interaction rituals one engaged in while “computing.” Even the computer mouse — itself a profound world-changing innovation developed at the same research center — was something they were looking to move beyond. A desk cluttered with a keyboard, mouse and video display — the canonical “keyboard/video/mouse” interaction framework — was old school in the near future imaginary of Ubicomp, right from the start. Although at this time — the late 1980s — this setup of keyboard/video/mouse was drawing more and more of a lay public into the world of computing, Ubicomp was



looking to create the computer for the near future — a computer for the “post-PC era.” The question was — what would computing look like in the 21st century?

What was envisioned was a wholesale shift in the means and even goals of networked computer technology. As a core principle, the Ubicomp imaginary sets out to develop technologies that are adapted to the ways humans interact with humans, rather than assemblages of technologies in which humans are shackled to the computer. The PC imposes constraints from the Ubicomp point of view — constraints by virtue of its size and weight, the way we are forced to sit down in front of it and stare at its flat screen, and hook our fingers over little plastic squares in order to “interact naturally.” Computing should not be about the needs and demands of the computer itself. From the beginning, design of computing practices should take into account the ways humans occupy, socialize and move in the world. According to Weiser, these issues outlined some of the contours of Ubicomp — a “next generation computing environment in which each person is continually interacting with hundreds of nearby wirelessly interconnected computers.” [<http://cli.gs/4TGnBY>]

## Sounds like science fiction

It is particularly fitting that such a grand vision for a largely technical endeavor find unique expression in science fiction. Consider these themes in relationship to the *Minority Report* gesture interface, particularly in the context of whatever you may imagine a post-desktop/laptop-PC era may be in which our relationship between ourselves and our work — for example, manipulating lots of digital media content somehow brought backward in time from the future.

Imagining what an *entire* redefinition of such things might entail can happen in a number of ways, only one of which is the hard, studied, intense work of brilliant scientists, anthropologists, designers and artists working on Ubicomp at Xerox PARC in the decades following the 1980s. We might also reasonable hope that the fun, hard work of imagining a near future world can be explored through many other approaches to idea materialization, not just the techniques of science fact production. We might reasonably wonder how science fiction re-imagines today’s style of computing and interaction design in a world tomorrow, where there are ubiquitous networks of connected sensors and other, new, yet-to-be imagined kinds of

interaction rituals. And we might also wonder about the larger social context of that future world, from the profound to the everyday. What do *people in the future do*, absent their supposed need for next generation microprocessors, retinal scanning sensors, RFID credit cards, biometric car keys, robot vacuum cleaners or WiFi-enabled bread makers? Is the world friendly or scary? Do people trust one another? How’s the weather? Are ice cubes more valuable than gold? Has phoning someone up become as vintage as sending email or throwing sheep? How does science fiction imagine what science fact has posited as possible vectors of research and fill out the context of human social life? What lives beyond the props? What are the stories that make up the world? How does a Ubicomp world “fill out” in its broader context? Can science fiction help imagine, extending the probable as well as highly speculative conclusions to Ubicomp research? Can it effectively prototype the concepts of Ubicomp by exploring, extending, hypothesizing, speculating through visual stories, for example, as one might find in science fiction film?

We might imagine that the best Ubicomp research has occurred in science fiction by virtue of the ability of its stories to speculate and bring to life the Ubicomp worlds that may come to be. Moreover, science fiction not only imagines the context of the Ubicomp future, it presents possible consequences, implications and the inevitable failures of technologies to close the gap between the pitchman’s hype and the actual experience. Science fiction prototypes the concepts.

Consider my favorite example (there are many more that I’m sure any science-fiction fan can conjure) of the *Minority Report* scene described earlier. It presents a prototype — a diegetic prototype as described in the previous section, to use David A. Kirby’s terms — of a kind of gesture-based interface technique for interacting with media elements. It’s a rather complete conceptualization of what would go into such an interaction ritual. It includes a “language” of gestures rather well considered by the technical consultant/engineer John Underkoffler that is consistent with the actions that the character is performing. The design suggests the use of a reasonable, glove-and-light tracking technology, and so forth. [<http://cli.gs/V05SSN>]

Further examples in *Minority Report* work through some of the other canonical, gold-standard concepts often discussed and puzzled over from the Ubicomp future imaginary. There is a web of ubiquitous, networked computers in the forms of sensors and displays “seamlessly” integrated into the fabric of the normal, human built environment. We see this in the form of

holographic advertisements found in the scenes where the John Anderton character is attempting to evade pursuing police. In this future, the Ubicomp world has greeters personalized to your database/life experiences, who pop-up into view after they’ve unobtrusively scanned your retina. The Ubicomp future imaginary in *Minority Report* has no annoying kiosk to type at in order to login to a shopping mall either online or in the bricks-and-mortar built environment. There’s no need to remember usernames and passwords — they’re all indexed to the unique biology of the pattern of veins on your very own retina.

Examples of the Ubicomp vision can be found in countless other science fiction examples. The recent Batman interpretation, *The Dark Knight*, shows the morally challenging possibilities of using *everyone’s* cell phones as a massive, world-blanketing listening, audio sensor grid that, just like a ship’s sonar, is able to create a three-dimensional map of the world.

Beyond imagining the possibilities of a near future world of ubiquitous computing style interactions, science fiction does science fact better than science fact in at least one aspect of its work. In what way might visual story tellers, technical consultants, props makers and science fiction authors be doing Ubicomp research and, perhaps, doing it better than their Ph.D. counterparts working studiously in their labs? They tell a better story because they are story tellers, because they understand that a technical instrument lives in a social world, whereas an engineer will tend to constrain the context to instrumental functionality.

A better story can make a world of difference, especially if the world is more likely to pay attention and share their insights and further circulate the knowledge, principles and perspectives on what such a future might be like. The engineer-scientist-researcher’s story is often muddled and technical and these kinds of “stories” — really narratives about operational nuances — only circulate amongst a few thousand of their peers, many of whom don’t bother to read their colleagues papers anyway. It is the principle of circulating knowledge that is at the core of the science fact enterprise, and it could do a better job of this. The connected graphs of citation tend to cluster and cycle and clump. Science is what it is by virtue of its ability to disseminate, argue about and share knowledge. Without that, science is only smart people sitting in a laboratory, sharing only amongst themselves, with no points of entry to disseminate their insights and the sense of what possible new worlds may derive based on their work. All science is only

ever potential. Without the ability to create a meaningful, human dimension to the work, to have it enter upon the world and create stories in which humans and their lives figure centrally — there is nothing more than abstractions that probably do not make much sense to those who need to be told a story about how life could be in order to give the knowledge relevance and meaning.

The science fiction film is arguably much more effective than the more generally understood way of creating and sharing scientific knowledge, peer review protocols notwithstanding. The film adds a kind of idea-mass to something like Ubicomp that spreads the story much further, gives it more meaning in the context of a reasonable, non-ideal, flawed, human social world and does so with more momentum than a dowdy paper in an obscure, difficult to find science journal that, at best, comes up with scenarios that are about as realistic as a laptop that never crashes or wireless phone networks that never drop calls. The Ubicomp science fiction can bring to light consequences, conclusions and implications much better than a science fact paper, or awkward laboratory demonstration.

Can you imagine explaining a Ubicomp gestural interface to a layperson used to the conventions of the canonical trinity of keyboard-video-mouse, without a story to help fill-in the broader, inevitable question of — why would anyone want this? Of what use might it be? Might not it be helpful to show a bit of *Minority Report*? You could say “*Hold on, let me show you a little bit of what I’m imagining; it’s science fiction, but still — I think it will help give your imagination a bit of an anchor, it will help explain what I am talking about. If you watch this, we will have a bit of shared, fictional imaginary space in which we can continue our conversation about this thing — this weird thing — that I am thinking about.*” It makes me think that any good scientist should also be particularly good at science fiction, maybe even better than they are at science fact. While we’re on this point, imagine how science fiction could be part of a better science and engineering curriculum, despite what the official curriculum sanctioning boards say.

Through this example, we can see how Philip K. Dick, Spielberg and Cruise together with a team of prop designers and technical consultants may actually be doing better Ubicomp than Ubicomp researchers at university and corporate research labs do themselves. In fact, it is the case that P.K. Dick, Spielberg and Cruise are Ubicomp researchers, they just don’t know it.

From a blog post on near future science fiction found on "Charlie's Diary" which describes near future science fiction as a genre of science fiction that creates linkages between "now" and an imagined, speculative "then" through compelling associations and extrapolations of existing technology.

"What is near future SF?

I'm prompted to write this entry simply because a number of folks on the earlier blog entry seem to have misunderstood the point I was making ... this is by way of illumination.

In my view, near future SF isn't SF set *n* years in the future. Rather, it's SF that connects to the reader's life: SF about times we, personally, can conceive of living through (barring illness or old age). It's SF that delivers a powerful message — this is where you are going. As such, it's almost the diametric opposite of a utopian work; utopias are an unattainable perfection, but good near future SF strive for realism.

Orwell's 1984 wasn't written as near future SF, even though he wrote it in 1948, a mere 36 years out: it explicitly posits a global dislocation, a nuclear war and a total upheaval, between the world inhabited by Orwell's readers and the world of Winston Smith. You can't get there from here, because it's a parable and a dystopian warning: the world of Ingsoc is not for you.

In contrast, Bruce Sterling's Holy Fire is near future SF, even though it's set nearly a century out; his heroine, a centenarian survivor from our own times, is on the receiving end of a new anti-aging medical treatment that has some odd side-effects, and so we get a chance to tour the late 21st century vicariously. You're meant to think, "I could end up there" — that's the whole point of near future SF.

Technothrillers aren't near future SF. Technothrillers are thrillers first; they play against the background of the world as we know it (albeit the world of drama and espionage and public affairs) without considering the way the technology trappings they rely on might change the human condition. The high-tech stuff is window dressing.

Near future SF does different things with the same tools; they come front-and-centre -- or rather, their effects come front-and-centre, and the world is changed thereby. And they're not necessarily such obvious new technologies as smart bombs and wrist-watch radios; they might equally well be a new way of looking at the memetic spread of fashions, as in Connie Willis' Belwether, or social network mediated economics, as in Bruce Sterling's Maneki Neko."

Posted by Charlie Stross on October 2, 2008 2:14 PM on "Charlie's Diary" <http://cli.gs/4S8ndP>

Fan art evolved to the point of speculating about the technical particulars of props from science fiction is found in this diagram from The Star Trek Star Fleet Technical Manual [http://cli.gs/rduvjm], by Franz Joseph, a technical artist and designer who worked during the day for General Dynamics.

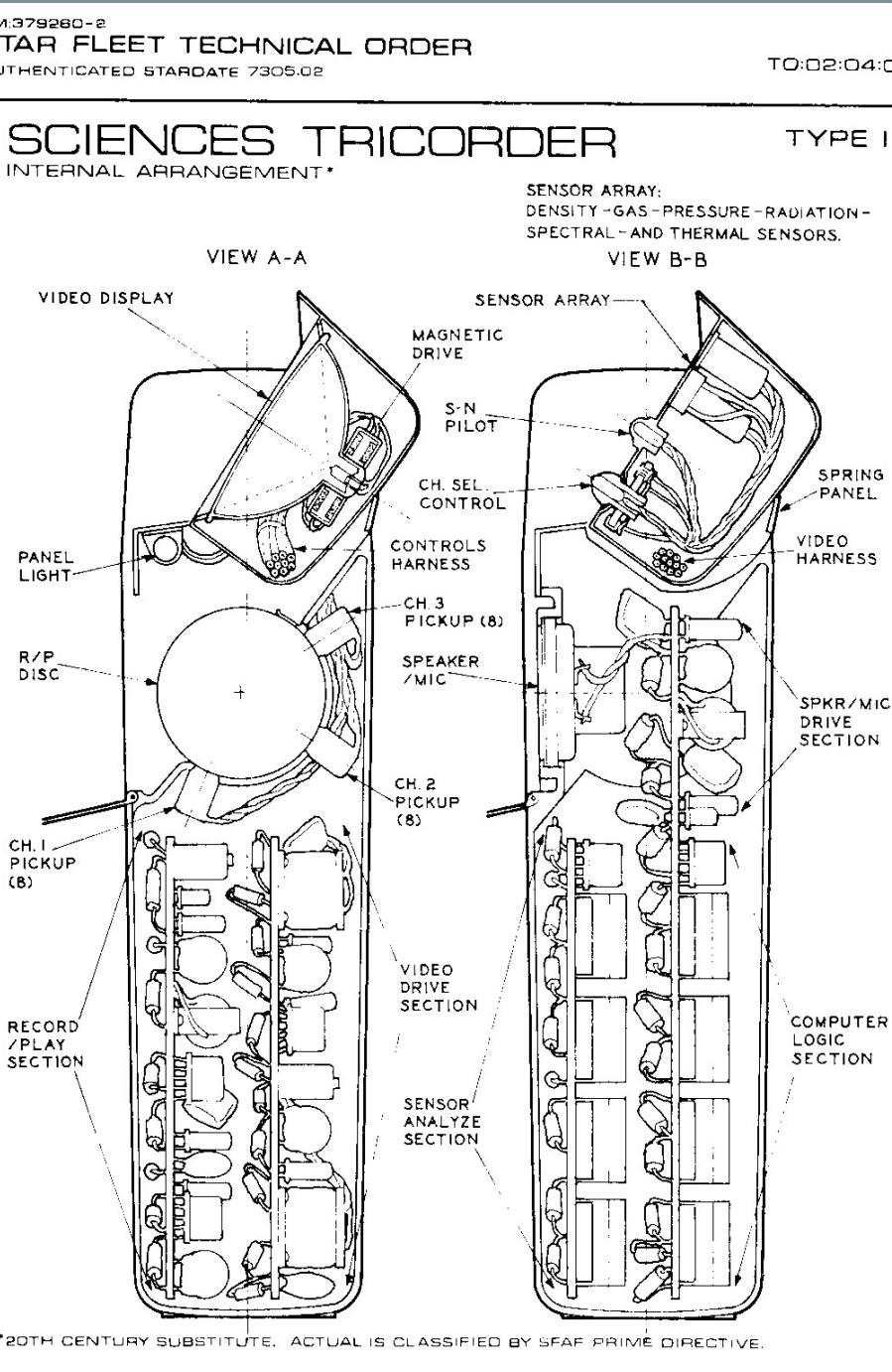
Joseph expressed his creative skills in speculative technical schematics, design documents and blueprints of Star Trek ships, clothing, instruments, weapons and control panels. The material proved exceptionally popular amongst fans, providing an additional point of entry for enjoying the science fictional world of Star Trek. His book is a kind of false document — one that turns the science fiction into a future science fact.

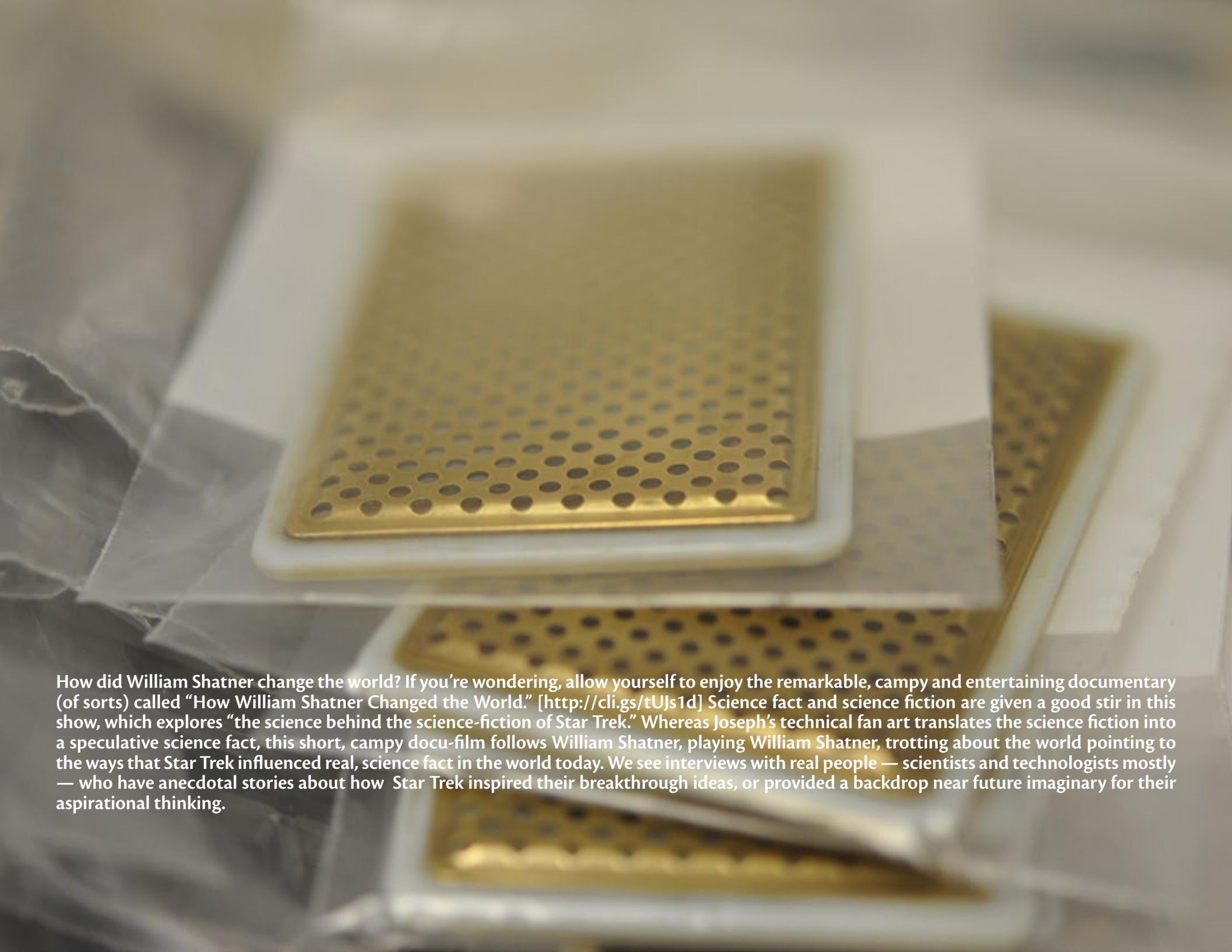
Even more intriguing, and another instance of border crossing that can occur when imagined worlds meet material worlds, is that the creative explorations in Joseph's works made their way back into the science fiction. His imaginary material became used as new props, backdrops and extensions of the technical and engineering principles of the science fiction.

Joseph's technical fan art translates the science fiction into a kind of science fact to the extent that he considers the materialization of the various artefacts. Patterns are given for constructing the Star Fleet uniforms worn within the science fiction. Architectural diagrams are drafted for the space ships. Regulation patterns for fleet colors and banners are specified. Organization charts for command and operational hierarchies are mapped out. There are design schematics for technologies that only exist in the science fiction.

This would be fandom taken to fanatical degrees unless you consider this in today's networked culture context. Plainly, this is "user-generated content" before there was such a broad sensibility about the meaning of such a thing. And this kind of expression is an important, albeit curious form of fact and fiction swapping properties, with unexpected outcomes. If nothing else, we can infer from this example the willfulness of people to express more completely the science fiction. We cannot anticipate the potential of this will to contribute to and circulate new cultural forms. For example, some of Joseph's material found its way into the science fiction as props in the show itself, including star ships he designed that, originally, when he drew them, were not part of the Star Trek science fiction world.

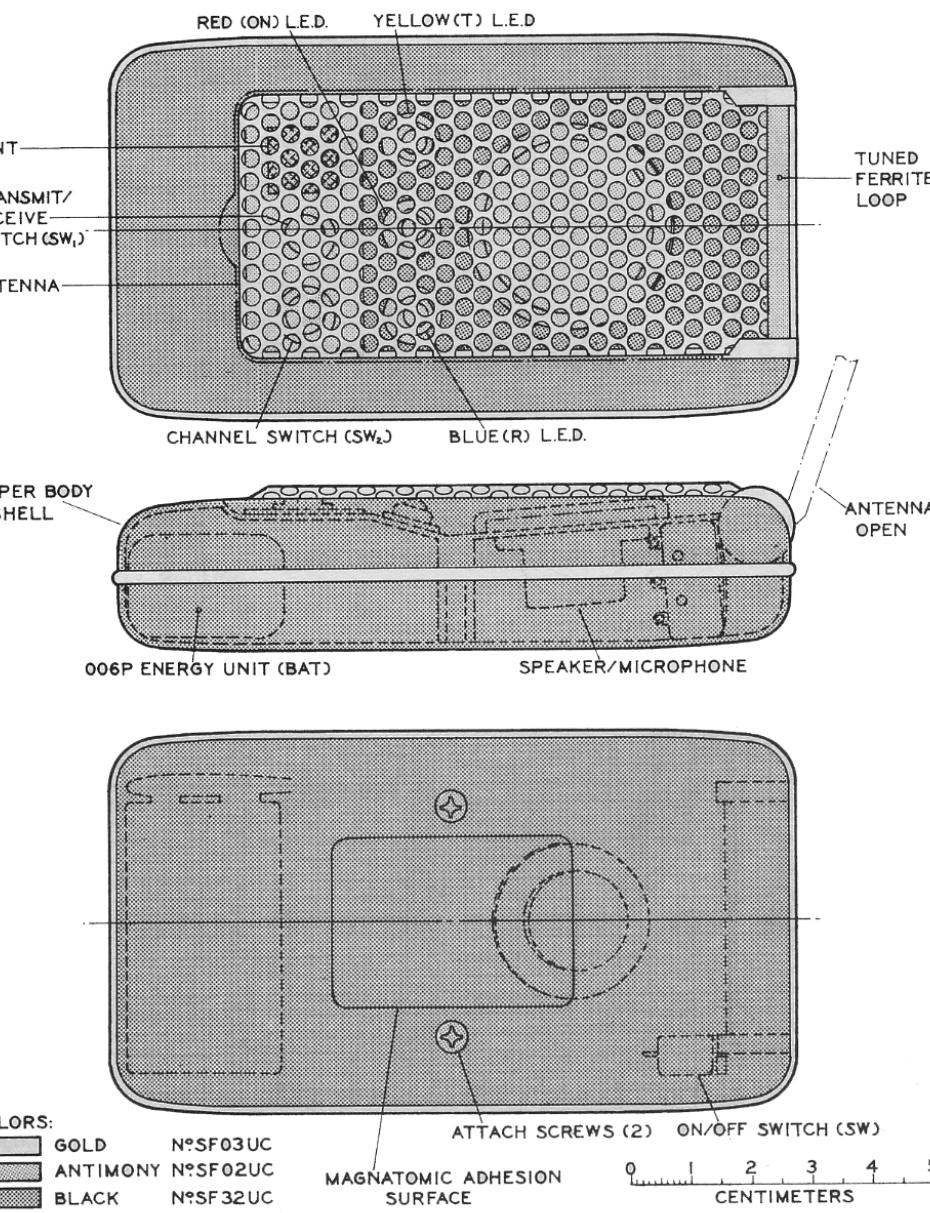
Anecdotally, Joseph's self-made Technical Manual, done without prompting by The Star Trek producers but with their encouragement, was very popular as indicated by its status as a New York Times best selling trade paperback (December 1976.) This may have prompted Paramount to consider reviving the franchise after its initial very short run.





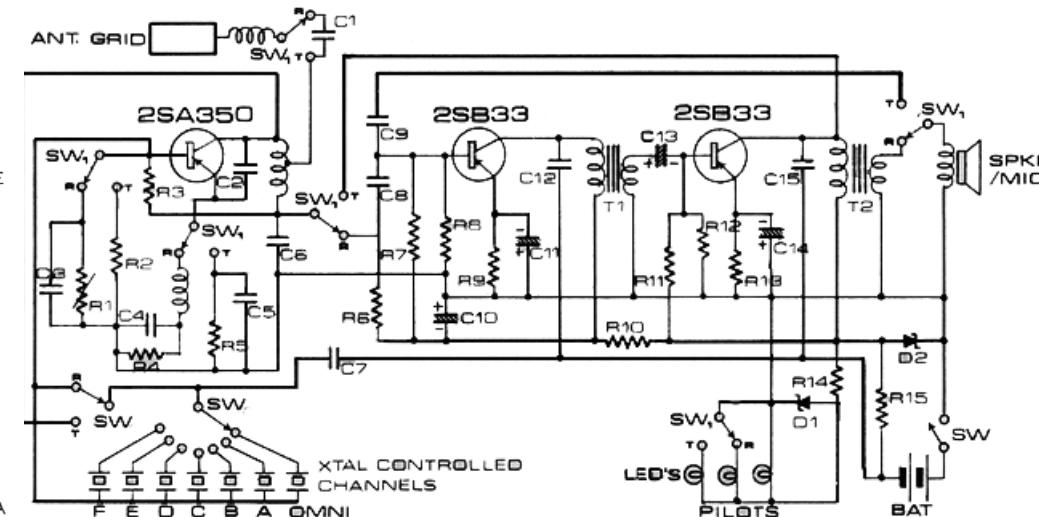
## COMMUNICATOR STANDARD FIELD EQUIPMENT ITEM

SPECIFICATION:  
L.O.A. 113.5MM W.O.A. 63.5MM H.O.A. 28MM  
WEIGHT 200GM RANGE 12000KM



How did William Shatner change the world? If you're wondering, allow yourself to enjoy the remarkable, campy and entertaining documentary (of sorts) called "How William Shatner Changed the World." [<http://cli.gs/tUJs1d>] Science fact and science fiction are given a good stir in this show, which explores "the science behind the science-fiction of Star Trek." Whereas Joseph's technical fan art translates the science fiction into a speculative science fact, this short, campy docu-film follows William Shatner, playing William Shatner, trotting about the world pointing to the ways that Star Trek influenced real, science fact in the world today. We see interviews with real people — scientists and technologists mostly — who have anecdotal stories about how Star Trek inspired their breakthrough ideas, or provided a backdrop near future imaginary for their aspirational thinking.

## COMMUNICATOR CIRCUITY DIAGRAM - TYPE 1



ANTENNA - (COVER GRID) - WITH TUNED FERRITE LOOP  
SW - ON-OFF SWITCH COVER ACTUATED - TYPE MICRO 1SMI  
SW<sub>1</sub> - NORMAL RECEIVE (R) PRESS TO TRANSMIT (T) (7 CONTACT)  
SW<sub>2</sub> - ROTARY 7 CONTACT RF SWITCH  
SPKR/MIC - SPEAKER/MICROPHONE - TYPE 32-0214/8Ω/0.1W

CHANNELS	
CH	MHZ
OMNI	27.125
A	49.91
B	49.93
C	49.95
D	49.97
E	49.99
F	N/A

Franz Joseph. 1975. Star Trek Star Fleet Technical Manual.  
<http://cli.gs/rduvjm>.

CURSOR

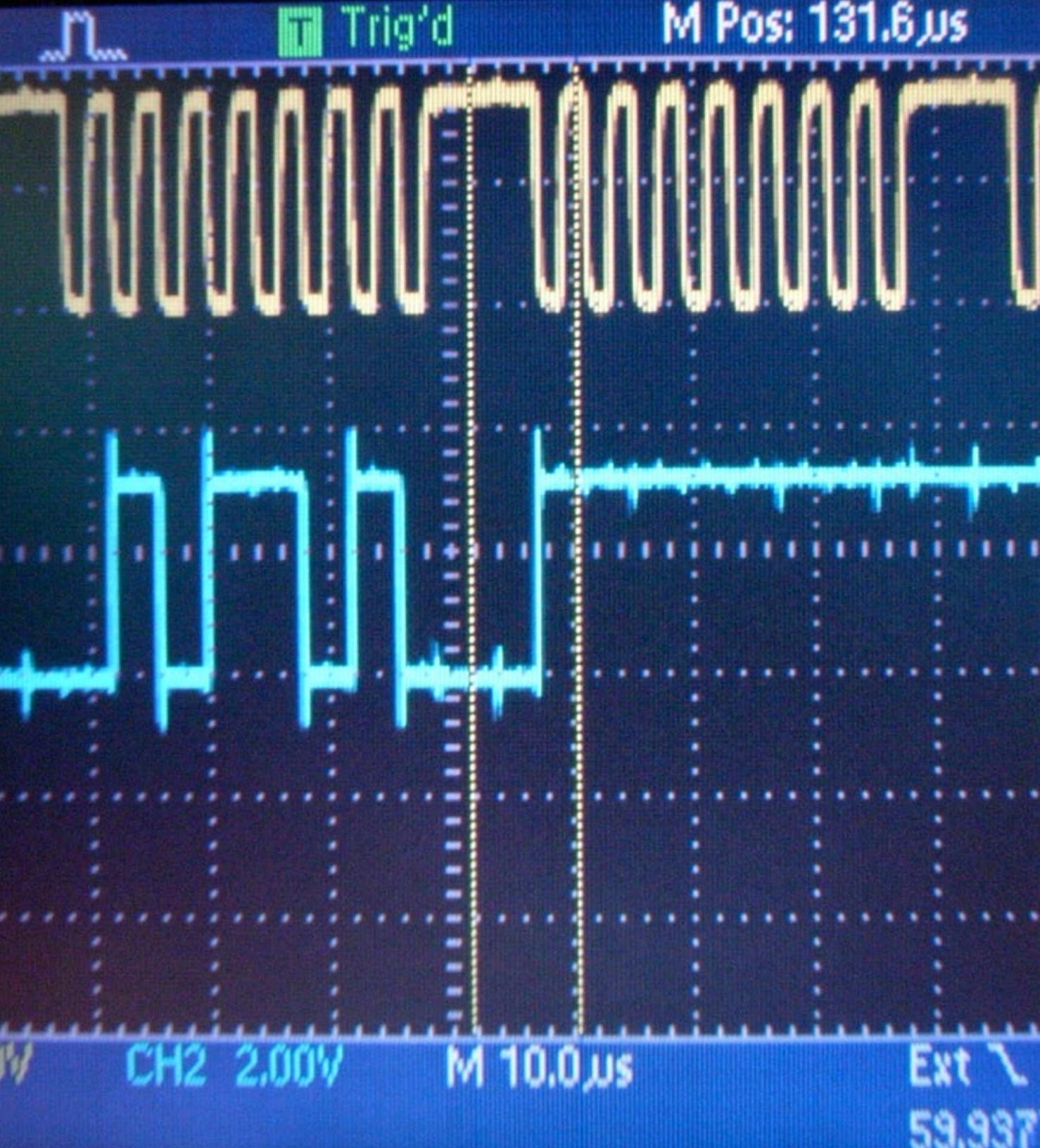
Type  
Time

Source  
CH1

Delta  
8.800  $\mu$ s  
113.6kHz

Cursor 1  
142.0  $\mu$ s

Cursor 2  
133.2  $\mu$ s



not be ironic. It should be a matter of course, a routine aspect of how new ideas come into being. This can be the case if we allow for productive, creative, undisciplinary entanglements of science fact and science fiction, with no primacy over who or what gets to matter most in the act of making the future.

In some ways science fiction is the core DNA of Ubicomp, coming as it does from the underlying assumptions and motivations laid out in the early statements as to Ubicomp's goals. In what follows, I'd like to explore the notion that Ubicomp always has had a relationship to science fiction in a productive, fruitful way. Certain of Ubicomp's properties indicate that it is in-between science fact and science fiction. It is a kind of science fact that is also at the same time a kind of science fiction. In particular there are two properties to highlight. *The first is the way Ubicomp imagines the future it aspires to and constructs through its projects. Second are some of the important themes and central concerns that exist in its shared imaginary, many of which also find expression in science fiction proper.*

I didn't come up with these two properties on my own. I read them in a pair of essays by two scientists from the Ubicomp field wrote over the years. Paul Dourish is a computer scientist, and Genevieve Bell is an anthropologist. They've worked at places like Xerox PARC and Intel and the University of California, so they know what they're talking about. They've done Ubicomp from a number of angles. Ubicomp is a practical matter for them — something to be constructed — as well as something to be studied in itself and to be understood as an endeavor of human beings intent on creating a particular near future technoculture. Two essays they've written together capture these properties well, and do so in a way that allows us to draw together some conclusions about design fiction. The essays create an extended contour around Ubicomp that is a reflective account of Ubicomp itself, rather than a technical article or project write-up.

The first essay I'm referring to was published in 2006 in that expensive journal — Personal and Ubiquitous Computing. It is titled "Yesterday's tomorrows: Notes on ubiquitous computing's dominant vision." I was able to get it because I've managed to get access to those expensive journals through the various jobs in and out of academia I have had. This one essay says about as much about Ubicomp and what it is as we'll need for the time being, so this is where we'll start. It provides an entry point into the knot that ties science fact to science fiction and, in that messy entanglement, in the act of

## Science fiction is at the core of Ubicomp

A science fiction film will not necessarily tell you a whole lot about Ubicomp as a field of knowledge production, although it can do a great job of imagining what Ubicomp in the world of human social practices becomes, and not just the ideal fantasy world that never comes to fruition — the one the marketing people tell of seamless, perfect internet connections and spotless kitchen counters. The science fiction film can do a better job of imagining the Ubicomp future than Ubicomp can imagine for itself. To find out what Ubicomp is from the perspective of the non film-making, science fact practitioners means turning to one of the Ubicomp knowledge circulating mechanisms, the academic journal. In this case, you might pick the journal "Personal and Ubiquitous Computing" — one of the more prestigious journals in the Ubicomp field. It will cost you dearly to find out about Ubicomp from ubiquitous computing professionals. You'll shell out over \$1,100 for a year's subscription to that journal. That's 8 issues. That's definitely more than the price of admission for a science fiction film, or the cost of a Philip K. Dick book, or a subscription to a good science fiction quarterly, any of which will almost certainly have more good Ubicomp in them than one volume of that stodgy, expensive academic journal.

Maybe you have access to Personal and Ubiquitous Computing through your job, or you're a student at a university with a subscription, or your local public library system is particularly recession proof and fast-and-loose with its periodicals budget. In these cases, you can participate in the science fact of Ubicomp. But the obvious irony is that the science facts of ubiquitous computing knowledge are hardly ubiquitous. For most people who watch a science fiction film like *Minority Report*, I would guess that the dominant near future imaginary for networked computation is disrupted more powerfully through the film's story than the conventional scientific paper publishing mechanism of circulating new ideas about digital technology. Such need

the knotting together, describes what I mean by design fiction. Their point in this essay is to consider that Ubicomp has always been about a future perpetually deferred. Ubicomp has from the start been about the near future. The Ubicomp world is one imagined to be a few years from now, which is an unusual principle for a science fact. So unusual that it is perhaps more closely aligned with near future science fiction than it is with other boring old pragmatic engineering-style science fact.

The second essay is called “Resistance is Futile’: Reading Science Fiction Alongside Ubiquitous Computing.” You can find it in that same expensive journal. This essay does something quite bold in that it looks at the collective imagination of the Ubicomp field (scientists, researchers, and so on but, curiously, not its objects and props and prototypes) alongside of the science fiction imaginary as seen through a number of science fiction shows that are arguably part of the shared history of Ubicomp researchers. By itself, this topic is intriguing, first because it is not typical for a technical journal to publish a reflection of this sort — one that draws more from humanities in its approach and argument than from the idiom of the technical paper. But, more importantly in the context of design fiction is their argument that *the narrative themes and cultural implications within the science fiction stories are properties that participate in design practices whether you like it or not*. These themes are only in science fiction in their examples because they are largely ignored and considered irrelevant in most technological design practices. But allowing these themes to “participate” in technological design has value to the design practice and its methodology.

The purpose of sketching this very brief two-point contour of Ubicomp is to describe it as an instance of how science fact can usefully behave as science fiction, drawing from the frankly more liberating, innovative means of turning ideas into material than most conservative, rational, level-headed, markets-driven science fact is able. It takes some steady nerves to let go of convention and expectations about how the future looks, the direction to which progress is meant to go, constructively imagining that there are multiple possible futures rather than one future that goes in one direction (up and to the right), or one future, evenly distributed. Rather than pursuing science under the old assumptions about the singularity of facts, why not a bit of engagement with speculation that wraps an imaginable world around some props, prototypes of ideas and a few conversation pieces that help tell a larger story about the world in which you might live, in the near future.

## Ubicomp’s near future

In “Yesterday’s tomorrows” Bell and Dourish describe Ubicomp as an endlessly deferred vision of technology for the future. They reach back to the defining essay on the topic, written by Ubicomp’s avuncular visionary, thought-leader and one of its founding scientists, Marc Weiser.

Weiser set out a vision of the future through what he called “the computer of the 21st century.” Bell and Dourish ask themselves: what does it do to this unusual technology enterprise to base its endeavors on a vision of the future, when most technology enterprises base their endeavors on a problem rooted in the past that is meant to be overcome in the future through the hard work and tireless efforts of science and technology? In their words:

*“Most areas of computer science research..are defined largely by technical problems, and driven by building upon and elaborating a body of past results. Ubiquitous computing, by contrast, encompasses a wide range of disparate technological areas brought together by a focus upon a common vision. It is driven, then, not so much by the problems of the past but by the possibilities of the future.”* [<http://cli.gs/XS36Mn>]

The dilemma that arises is that this shared vision first expressed by Weiser and then taken up in full-force by Ubicomp scientists internationally had this explicit deadline of sorts: *the computer for the 21st century*. After more than a decade and, now, snug in the 21st century, Dourish and Bell point out that, “We now inhabit the future imagined by [the Ubicomp pioneers]. The future, though, may not have worked out as the field collectively imagined.”

The point that the computer for the 21st century as described by Weiser has yet to come into existence, or that the computer for the 21st century still looks very much like the computer for the 20th century is not a reason to dismiss Ubicomp, of course. It was not that Ubicomp necessarily expected to achieve a specific deadline and make this thing that was living in a shared imagination. Ubicomp set a specific goal which may have been reasonable as a set of parameters for a speculative design of the near future of computation. It was as if Weiser’s visionary statement is saying *“The ideas developed here, in our labs, are what we imagine to be pervasive, mass-market, vernacular experiences in a couple of decades. This is how we’ll work together, to make this entirely possible near future.”*

This notion of a “proximate future” as Dourish and Bell describe it, is an aspirational future, a near future imaginary. This is an important property of Ubicomp, and a reason why it should not be taken too literally, otherwise you may miss its most important property. It is as if Ubicomp is less about creating technologies than it is about creating materialized idea-objects that are, in some way, *from* or *for* the near future. It is as much about doing research in laboratories as it is about a dramatically different future in the act of being created. But there’s more. Ubicomp “imagines” in a way that allows it more than a usual amount of leeway to consider future worlds, even speculate about peculiar corners of that future.

This is Ubicomp’s curious relationship to the future. Effectively it is working on the future in a way that most other technology enterprises are not able to do, or in fact are not allowed to do. Speculating about possible futures is a relatively dangerous thing for science-fact to do. After all, it could come out wrong. Most science-fact works under the assumption that there are facts out there to be revealed and, with enough time, this revelation will come to pass. There is a combination of chemistry and mechanics that will create a battery that lasts longer than the batteries of today. It might include a mix of dried oats, corn syrup and naphthalene, but with enough time and energy and commitment, a new battery chemistry will be found that lasts 5% longer and weighs 5% less. That is the incremental approach. Quite conservative, safe, necessary to certain models of economic growth — and rather boring. On the other hand, Ubicomp seeks to achieve wholesale changes in how humans and computers worked together.

The combination of a “proximate future” and radical, wholesale changes in the way computation and humanity are tied together is bound to create difficulties in the path from imagination to materialization. Whatever the idea of a “proximate future” for Ubicomp might be by example, it works on a future endlessly deferred, always off on the horizon. It is a kind of future that is only ever imagined. It never quite becomes material form in the same way as that of those guys working hard to make laptop batteries that last 5% longer.

Incremental adjustments are boring because they are possible to imagine as logistical exercises, however painful and costly these may be. The wholesale change is different from a future that is assumed will come to be with enough funding and time and computer workstations and graduate students to run tedious all-night experiments.

By contrast is the Ubicomp future, one that is imagined and discussed through speculative prototypes, unexpected and peculiar interaction rituals and imaginative devices and enabled objects. In an unspoken way Ubicomp is a science created to encourage conversations about possible futures through objects that speculate, not possible futures based on objects that can be manufactured. It is a very different future, much different than the kind of logistical future that many technical enterprises use as their vision of how things will come to be. In effect, Ubicomp is a kind of fiction, working with and through science to project possible near future worlds. It is not a materially substantiated future. In fact, it is a future that can only be effectively represented as science fiction.

## Putting Ubicomp alongside science fiction

Another important essay that Dourish and Bell wrote more recently is called “Resistance is Futile’: Reading Science Fiction Alongside Ubiquitous Computing.” [Draft available at <http://cli.gs/VZyDrQ>] The essay starts with the premise that any kind of research enterprise such as Ubicomp that has elements of exploratory design associated with it is going to be engaged in some sort collective imagining. But collective amongst whom? Ubicomp, despite being a technical enterprise, is quite interdisciplinary. Not only within the technical practices but also beyond. There are pretty serious anthropologists and other social scientists working alongside of equally serious hardware engineers. There are even some artists who work exclusively with technology as their expressive medium who participate in the Ubicomp field. With such a mix of backgrounds, approaches to knowledge making, disciplinary quirks, assumptions about what is and is not valid, useful or meaningful — what could a shared imaginary be? What are the collective visions of this endlessly deferred future that serve as an index for their work? What do Ubicomp researchers point to and draw from in order to describe the ideas they imagine, but have not yet materialized? If Ubicomp is about a proximate, near future, what ties these researchers together and points to that shared future? What gives them a common set of goals, aspirations, language and a sense of community?

Bell and Dourish point out that science fiction, particularly in a popular form, can offer a way to understand the potential and possibilities of emerging technologies, or even imagine possibilities that have not yet been

formalized through conventional science. They orient science fiction, particularly television science fiction from the 1970s, in such a way as to offer a hint at a possible point of commonality. Science fiction imagines possible future worlds. This stake in imagining the future is something also held by Ubicomp, mostly clearly as articulated by the early Ubicomp objectives as they describe in the earlier essay "Yesterday's Tomorrows." It makes sense then to look at science fiction alongside of Ubicomp in order to more fully explore some broad themes that undergird Ubicomp and give it some of the important characteristics of its shared imaginary.

In "Resistance is Futile" Bell and Dourish situate Ubicomp alongside five examples of science fiction that they present as some patches of common ground for a Ubicomp collective imaginary. The science fiction they offer are five visual stories that became popular through television and film. I'll list them here. They are: *Dr. Who*, *Star Trek*, *Planet of the Apes*, *Blake's 7* and *Hitch-Hikers Guide to the Galaxy*. These are five television shows that we might imagine to form part of the cultural history of Ubicomp researchers. Or, for younger researchers, they will have an awareness of these shows to one degree or another, perhaps through re-runs, or sequels to, for example, *Star Trek* or the modern rendering of *Hitch-Hikers Guide to the Galaxy*.

Through these shows Bell and Dourish look at broad themes — bureaucracy, technological breakdown, frontier and empire — within the science fictions by briefly addressing how the themes are presented as part of the narrative and drama. This is their set up to explore the parallels to ubiquitous computing research, which, like science fiction, considers the larger cultural contexts into which its imagined technologies will be entangled.

*"..we are interested in the ways in which science fiction – the literary figuring of future technologies rather than the practical figuring of much contemporary research – engages with a series of questions about the social and cultural contexts of technology use that help us reflect upon assumptions within technological research."*

Their essay is not meant to be an exhaustive analysis of science fiction and Ubicomp. It provides a few insights about science fiction and Ubicomp, using these to describe the larger, more exciting suggestions I read within the essay which is that science fiction can be a first-class participant in the design process. The specifics of each science fiction show are intriguing in and of themselves. For instance, the frontier sensibilities of *Star Trek* and the

way this runs counter to the bureaucracy that the Enterprise has left behind in its exploration of the hinterlands of the universe. This leaves us with a story that is as much about independence and as it is about highly technological space exploration. The two — technology and "rugged individualism and independence" — can go hand-in-hand, a mythos not always consistent with another popular conceptualizations of technology as a domineering, soul-crushing force.

Culture "embeds", as it always must. There is no pure instrumentality in technologies, or sciences for that matter. The arrival of an idea, or concept, or scientific "law" comes from somewhere, never "out there" but always rather close to home. Bell and Dourish are telling us this in their essay using the particular example of Ubicomp. Ubicomp endures its own cultural specificity and debt to things like desire for specific near futures that are given an aspiration portrait in, first of all, the imaginative vision of Mark Weiser and, second of all, some good old fashioned near future science fiction. They are both techniques for connecting the dots between dreams, the imagination, ideas and their materialization as "shows" that talk about the future, exhibit artifacts and prototypes. Those "shows" can take the form of a television production, film, laboratory activity, research reports, annual gatherings of die-hard fans at Ubicomp conferences and Star Trek conventions, and so on. They're all swirling conversations that are expressions of a will, desire, creativity and materiality around some shared imaginaries.

Bell and Dourish are not saying this directly, of course. I am making broader but perhaps more incisive claims about the activities by which culture happens in Ubicomp. I am using their insights about the culture of science fiction and the ways in which it finds its way into Ubicomp first principles. Effectively I'm saying that knowledge and ideas and material are circulate in a productive, engaging way across practices in an undisciplined, highly volatile and engaging way. The point is this: imagining the future of computers, different from today, and the pathways toward that goal are illuminated in good measure by the visions and imaginations of science fiction as much as they are by the desperately pragmatic activities of things like Ubicomp.

Bell and Dourish are reminding us that the implications of culture are not something that happens after design. They are always part of the design. They are always simultaneous with the activity of making things. The culture happens as the design does. This is in every way what design is about. It is



less about surfaces and detailing, and perhaps *only* about making culture. By making culture I mean that things-designed become part of the fabric of our lives, shaping, diffracting, knitting together our relations between the other people and objects around us. Making culture is something that engineering has so effectively and, at times, dangerously pushed out of view, which is why design should participate more actively and conscientiously in the making of things. Engineering tends to start with specifications, assuming that terse instrumentalities and operating parameters evacuate the cultural implications. Design brings culture deliberately. It's already there, this culture thing — design is just able to provide the language and idioms of culture, a language which engineering has long ago forgotten.

Social or cultural “issues” or “implications” are always already part of the context for design. These are not issues that arise from a technical object once it is delivered to people, as if this act of putting an object in someone’s hands then somehow magically transforms it into something that, now set loose to circulate in the wild cultural landscape, produces “issues” or creates implications. It is the case that the social or cultural questions are always already part of the operational procedures of the engineering work, never separate. One need only look at specifications and read closer than the surface to see where an how “culture” is the technical instrument. Despite the fact that it looks like a bunch of circuits and lifeless plastic bits, there is culture right there.

Bell and Dourish point out that:

*“Wittgenstein argued that to imagine a language is to imagine a form of life; we might make the same observation about imagining technologies. Cultural questions, then are prior to, not consequent to, design practice. The kinds of questions we have raised then are not, we would argue, remote ones that we have yet to encounter; they are ones to which..we have already committed ourselves.”*

They are saying that, no matter what — cultural questions are always already present, so why not actively engage them as such, and not as “issues” or “problems” to be addressed, but as useful, core aspects of the design process. The topics Bell and Dourish chose to emphasize that surround their science fiction examples are only a few of the cultural issues that are often ignored or considered outside of the realm of design. They are also big topics, and we might also wonder about the quotidian, speculating about

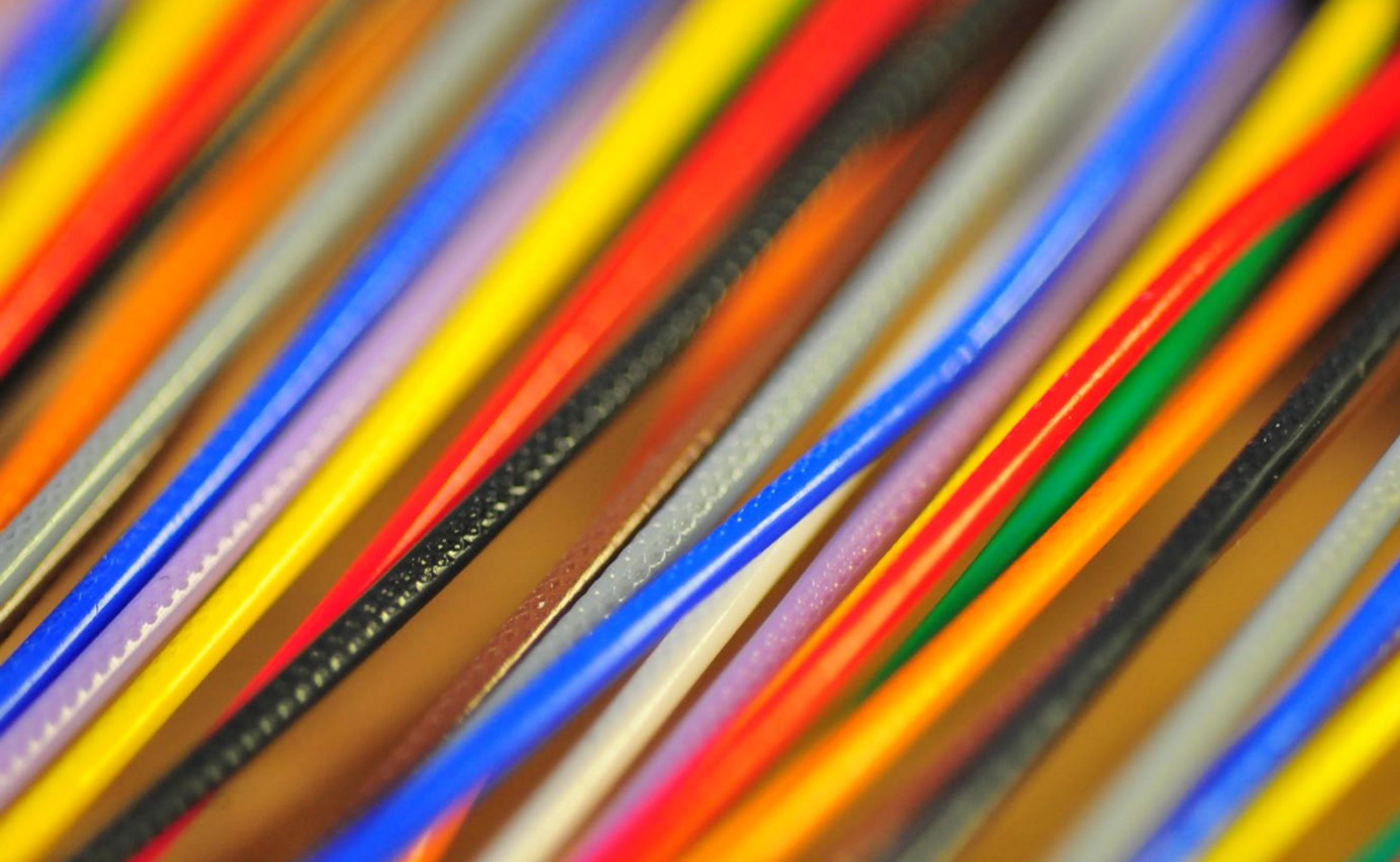
more tactical issues in design speculations. Regardless of the level of consideration, these cultural questions are core to any story about life lived, as much as they are core to any design practice, whether you like it or not. It’s not enough to stop at the surface of a designed object. You have to put it in someone’s hand, imagine it’s everyday, from the fantastic possibilities to the mundane annoyances. Design is more than specifications.

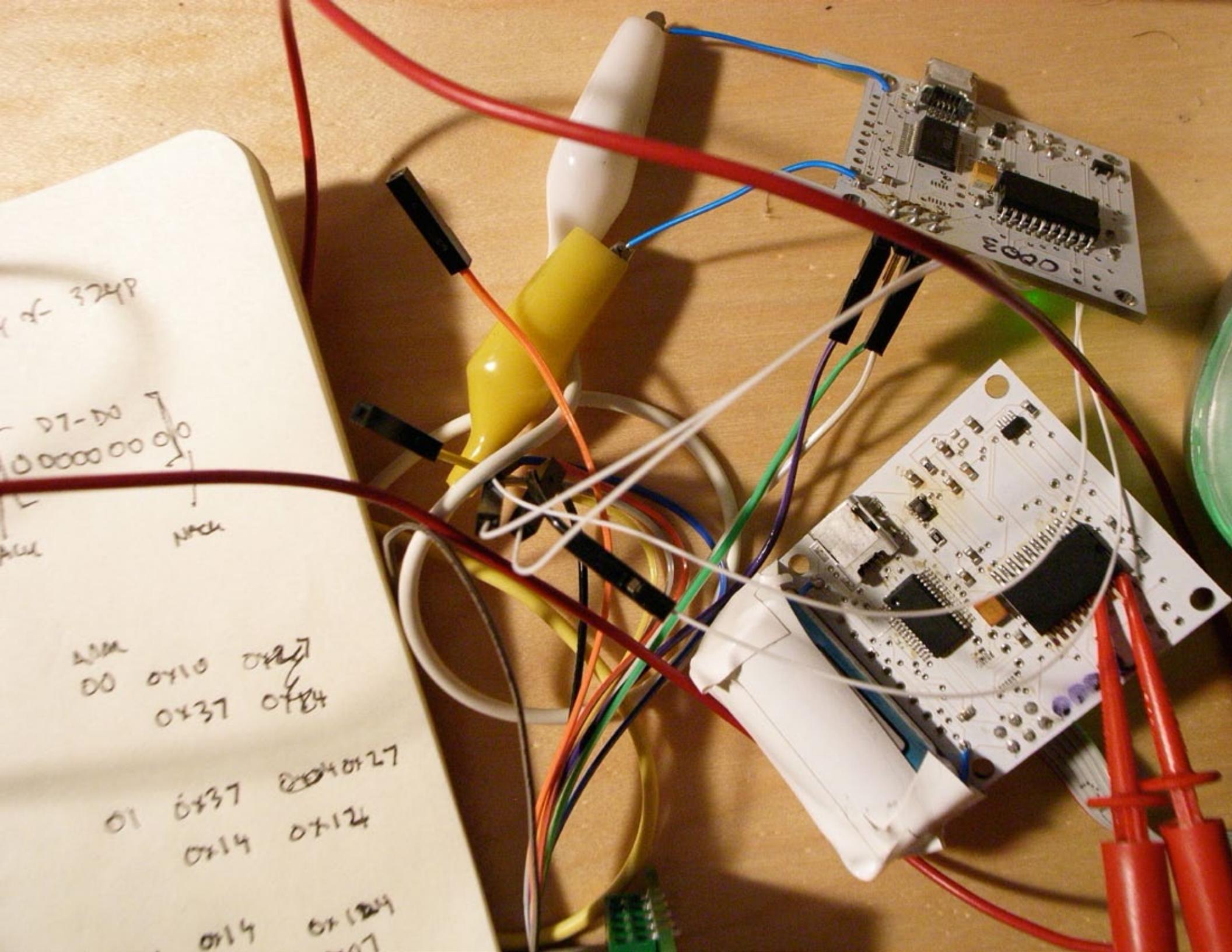
A conclusion to this point might be to consider elevating science fiction, to that of a deliberate resource, a mechanism or approach as one might employ any design resource, and do so in order to consider the culture questions that are not always done particularly well with the technical instruments and techniques used to construct technologies. Rather than something separate from the conventional methodologies of technological design, employ science fiction in order to engage in a design practice that can examine and discuss the properties, consequences and ideological stakes of emerging ideas at the point in which they begin to take on material form? That is — use science fiction as a deliberate, overt way of re-investing culture into the process of making things, particularly the kinds of things one finds in a networked world. Just as one may involve a crackerjack data structures and algorithms jockey, or an adept wireless electronics guru who can help address that thorny design issue of getting your network card to meet FCC certification standards, why not a provocative design fiction visionary that can help fashion the near future imaginary in which the emerging design lives. What is the world like? How is it shaped by this or that user interface speculation or a hypothetical social ritual?

The design fiction role is not a superfluous role in the design team, something to be done with extra budget, or if time permits. Rather, it is as significant as the guy doing the FCC certifications, as vital as the CAD software that participates in creating the tooling specifications. The design fiction role is crucial to achieving the goals and meeting the aspirations of the emerging ideas as much as any other first-class participant in the design process. Its failure is the failure to imagine what the idea and its materialization become, not only as an object by itself, but an object that participates and becomes socialized when it falls into the background and becomes a “prop” through which people’s lives are lived, really. Not the seamless perfect lives that are unimaginatively pitched through the object’s advertisements — the ones that entice us to participate in the uninspired fiction of the sales and marketing teams. But that object, when it achieves its low points as well as its

high points, it’s liberating benefits to free us from life’s hassles as well as its dire consequences and points of failure.

Rather than seeing objects as non-social bits of chemistry and circuitry, for example, imagine them as they are — as enablers of social relations and facilitators of social interaction rituals. What Bell and Dourish emphasize is that the cultural “implications”, which are often considered to be something that arises later, after the soldering and breadboarding and clean-room work is done and the thing is tooled, manufactured, packaged and sold — these are always already part of the technological design work. So, allow these issues to participate as part of the design practice. There is no easy way to insert these quotidian into the design practice without speculating. It’s not a software module or algorithm, it’s a story told. Science fiction can do this well, so why not start there, as a hybrid of design, science, fact and fiction.





## CONCLUSION

# 06

in order to think about how design can tell thoughtful, speculative stories through objects. Even though I was doing my own bit of linguistic bolting-on, I decided on fiction not so much to create objects that are for story telling, but to create objects that help think through matters-of-concern. I am interested in working through materialized thought experiments. Design fictions are propositions for new, future things done as physical instantiations rather than future project plans done through PowerPoint.

There are stories, of course. Stories with objects; stories embedded within objects. They surround the object, without drawing undue attention to it. Like the role a prop performs in the telling of a story: it's not there for itself, it's there to move the story forward. And if we're trying to imagine new, more habitable future worlds, we need stories that help anchor those worlds in a shared imaginary. Stories with something to 'grab hold of' are better, more compelling; they get the makers and craftspeople behind it. That is the role design fiction objects play. They help move these stories forward, adding consistency, continuity, and a set of indices - things to point to and ponder. They are the things that stand in for that future and refer us to it. They help us imagine.<sup>1</sup>

In order for this perspective of design fiction to work out, it is necessary to consider that it has nothing to do with any kind of instrumental activity that fits simply and neatly in connected boxes of process flows for manufacturing things. It's more than just surfacing, or detailing, or putting machined and milled boxes around engineered functionality. This is the same as saying that design fiction (or design, broadly as far as I understand it) is not the last thing that happens before an engineered device is ready for the world outside of the laboratory.

What I'm saying can be summed up neatly: Engineering makes things for end-users. Accounting makes things for markets, demographics and consumers. Design makes things for people. Pick your practice. Claim your priorities.

3. So, long as design is a way of thinking through questions and problems,

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Of course, I'm not the only one to think about objects as things that tell stories. In my own approach to making new peculiar things, I've only started to understand how design can become part of that process of making things. I've learned quite a bit from many of the designers and thinkers about design who consider design as a way to engage in different kinds of conversation, or to tell stories through the action of making and presenting those made things.

and provoking by “hitting raw nerves” [Stefano Mirti <http://cli.gs/WmqJPG>]; and so long as design is a way of moving “upstream and not waiting for science to become technology and then products” [Anthony Dunne <http://cli.gs/LsBSzv>]; and so long as design can create things that will be different from the conservative, old-fashioned, clearly broken continuity models of the future (‘up, and to the right’ graphs), or William Gibson’s distribution-spread model of the future (“the future is here, just not evenly distributed”) — what kind of stories about the future might design tell?

If these criteria could be achieved through a genre of story telling, what genre might it be? It would not be the only possible genre of course. It would be one that can help imagine some of the props that help materialize that near future, outline its properties, tell its stories, and so on.

My conclusion is that it would be science fiction, largely because that’s an imaginative, aspirational style of story telling. It speculates about possible future worlds. The more specific genre known as near future science fiction is particularly promising. It extrapolates from today in a legible way in that it is generally easier to imagine things extending from now into that near future imaginary, rather than wholly anchor-less speculations that are inconsistent with the logics of today.

(The kind of design I’m talking about is trying to determine with any certainty what will happen in the future. That’s just silly. We’re not interested in modeling behavior and saying with any sort of certainty or predictability what will happen. What design fiction is after is thinking through possible near futures based on a willfulness to create different worlds, perhaps more habitable, mindful of all the good things for which one might strive.<sup>2)</sup>)

#### 4. Why the near future? Why any future?

Because we’re trying to create new things forward from today, but we’re not willing to wait on the usual ways in which the future obtains. The future

2 ‘Good things’ are those things that contribute to and circulate culture and are not whimsical consumption. That specifically excludes things like a second flat screen for the bathroom/kitchen/garage, a new car that costs enough to send a dozen kids to a decent secondary school with good, diligent teachers, stainless six burner industrial stoves for kitchen dabblers, etc.

is not only an advancement of technical prowess, or discovery of new and peculiar subatomic particles. The future is not defined by the capacity to travel in space. There are other kinds of futures and other aspirations for different kinds of worlds. Those other kinds of worlds are ones that engineering and technology and science — the practice idioms that conventionally hold sway over what sorts of future worlds come to pass — these disciplines may not be best equipped to imagine on their own, or from the basis of the kinds of epistemologies that undergird these endeavors.

5. This said, the question now is - how can you get to the near future through design? One possible approach is to knit together science, fact and fiction.<sup>3</sup>

#### Why science fact and science fiction?

They are two forms of knowledge making and knowledge circulation that have a strong stake in making new possible near future worlds. Not all science fact is about the near future, but enough is. Perhaps the more pragmatic sort of science fact that is close enough in its matters-of-concern to help out in any worldly crisis. Neither is all science fiction about the near future, but there is some that is specifically about the near future, and so that’s good enough for me.

Bringing science fact and science fiction together allows us to let go of rigid, unyielding adherence to fixed “proprietary” processes. It lets go of constraints on the imagination often disguised as such by calling them “practicalities.” It is an approach that finds ways to tell speculative stories unhindered by notions of future prediction, or interpretations of focus group rationales, or markets demands, or end-users (whoever those are.)

3 I’m using “science” rather loosely here. I know this. I’m doing it for style and to force the exigent need for fact and fiction to balance out, the one with the other, as to their ability to make and circulate knowledge. This is what I have been saying all along, and something I believe in as a practical matter: fact and fiction are both responsible for the circulation of ideas into material substance, without either having priority or precedence over the other. Fiction is not “just” for the imagination. Fiction is “hard” in the same way one might say, “the hard facts of the matter are such-and-so.” Fiction has real, material consequences beyond what is generally understood to be the case. Fiction is not just for bedtime reading; you need it to create and propagate ideas and generate material from them. Without the capacity for fiction to translate the imagination in appropriate ways and provide a conduit to the materialization of ideas and, even more importantly - to circulate those ideas and that knowledge widely with as little friction as possible - there is no basis and no capacity for making things.

For all of its efforts, and all of its chaste, modest and well-heeled demeanor, science fact does a horrible job of circulating knowledge. In an open era, where the networks and mechanisms for sharing and imagining together are all in place and in their early days of producing large, productive “network effects” through sharing, this is inexcusable. Even worse, science fact cannot tell a decent story about the future to save itself, let alone anyone else. Science fiction does a much better job of circulating futures and enrolling people in the possibilities, and does so to the degree that things begin to happen on that basis alone. This is what matters and why fact and fiction need to come together in a coherent way. It’s not the ideas of scientists in a lab that matter, but what people (not “end-users”; not “consumers”; not even “productive consumers”) can contribute and add to their social practices, their interaction rituals, their lives and the possibilities for re-imagining and remaking those lives for the better. It’s not easy, and not trivial, and there’s no handbook on how to do it. It happens along the frontier outposts with things like maker communities with their DIY sensibilities. This is something takes visionary story tellers and visionary makers and willing collaborators who want to make frighteningly new experiences more than they want to make money.

6. What I had to do was show that fact and fiction do indeed routinely swap properties.

#### Why did I have to demonstrate this?

Because revealing the ways this property swapping happens reveals the force of both kinds of science to re-imagine the future as something different from today, and different from the conventions of what today imagines the future to be. This is what I was doing as part of this idea of creating things that “start and circulate conversation” about what can be(come). I had to do this because I wanted to implicate material practices into the analysis. It’s not so much that this property swapping happens. What is also important is *how* to do this in such a way as to make the conversations that yield material of some sort — objects, stories and that kind of thing to help move those conversations around. Making prototypes by themselves is not enough. *Prototypes* are coherent functionality, but they lack a visionary story about what makes them conversant on important matters-of-concern. *Props* help move stories along, so there’s something promising about them. My colleague David A. Kirby is onto something when he digs deep into this idea of the “diegetic prototype”:

*...cinematic depictions of future technologies are actually “diegetic prototypes” that demonstrate to large public audiences a technology’s need, benevolence, and viability. Diegetic prototypes have a major rhetorical advantage even over true prototypes: in the [story] these technologies exist as “real” objects that function properly and which people actually use.*

These kinds of prototypes, enabled by story, enlivened by a drama of some sort — they actually have advantage over fussy fully functional engineered prototypes. This is important and part of the sharing/swapping of properties in that both props of the kind that “diegetic prototype” implies, and prototypes of the more conventional variety can do something together that neither can do alone.

I brought up a few examples, including some brief sidebars to help draw out some of the contours around this idea that fact and fiction swap properties.

The big example of property swapping was between Ubicomp and Minority Report. I relied on Philip K. Dick, Paul Dourish, Mark Weiser, Steven Spielberg and Genevieve Bell to demonstrate how they (and everyone else involved) were all simultaneously doing work together to create near future worlds that are ubiquitously computational and networked to the gills. All the endeavors were mutually supportive and benefited each other to the extent that these future imaginaries became fruitfully entangled. We can’t imagine that world without constructing a variety of conclusions to Ubicomp — pretty, comical, happy, dark, disastrous. You just don’t know, and you can’t know if you give up on the possible multiple futures that are just as valid as the merry “up-and-to-the-right” future, or the gradual distribution-of-Ubicomp future goodness from the digerati out to the proles, eager for their self-shopping refrigerators.

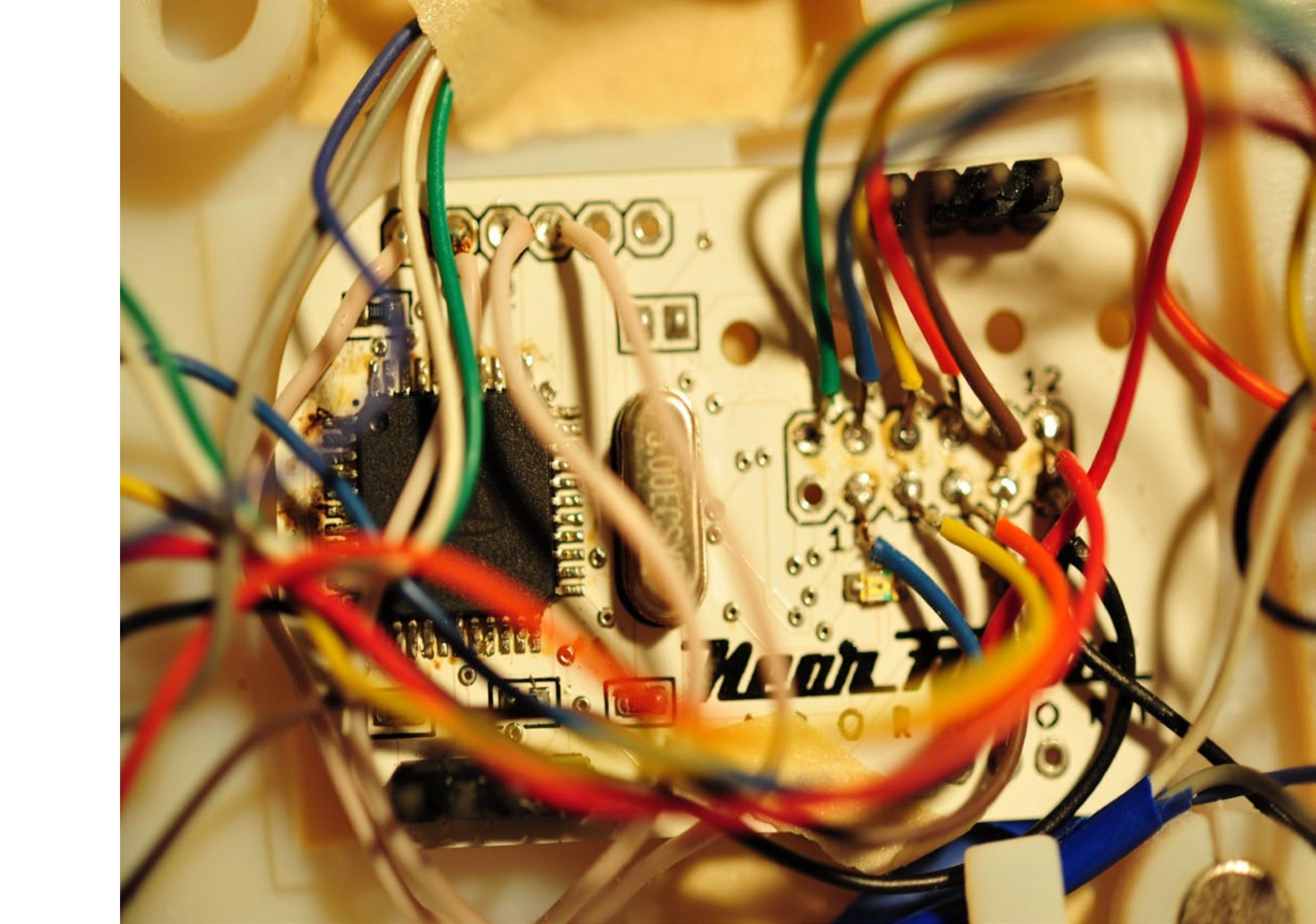
I looked briefly at Star Trek and the fascinating world of fan-art that delves deep and creates components and props that were never there in the first place and then circulate back to fill and patch-in the story. 2001: A Space Odyssey reveals the intricate process of making the near future of 2001 when seen from the late 1960s. The film production was as much a futuristic society as any at the time, involving technologists and scientists who were wondering the same things as Kubrick and Clarke, *and* working passionately on the same question. Together, they didn’t just work on a science fiction story, they were making science fictions based on the properties of science

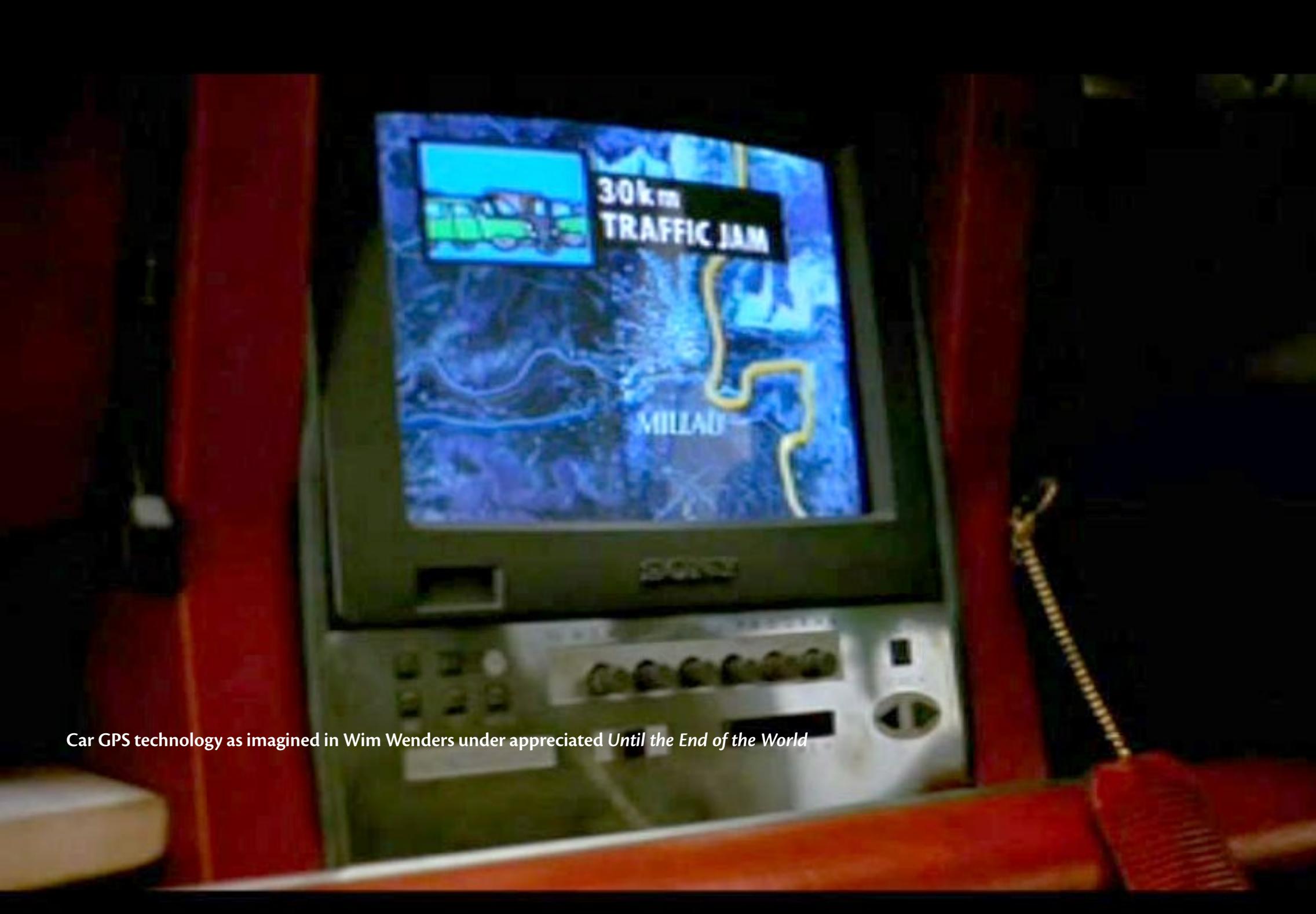
fact, and therein was this property swapping, back and forth.

There were other examples along the way, but those were the big ones. The others were meant to reveal other instances whereby fact and fiction swap properties as they help us imagine what the future might look like and how we might create or avert particular kinds of futures. They are provocations in this way, designed and built to think things through.

There are plenty of other fun, useful, design fiction examples. In “Ubik” P.K. Dick describes money-grubbing ubiquitously networked apartment doors that threaten to sue you if you try and undo their mechanism. This is the only reasonable conclusion to Ubicomp visions of the future when you factor in what smart warning labels and avatar-based end-user license agreements will sound and act like in 30 years. Bruce Sterling’s novel “Distraction” [<http://cli.gs/6mRaY6>] contains the idea of a “reputation server” — a kind of near future conclusion to the irrelevance of credit as a measure of one’s worth, and the complete collapse of trust in institutions. Individual and peer reputation matters more than money in Sterling’s near future. If you’re curious about the conclusion to all this Twitter mishegoss, read Sterling’s Maneki Neko [<http://cli.gs/mhQXN8>], a short story that prototypes the near future of a combination of location awareness, Google Analytics, network effects and the “gift economy.”

So, what? Why does all of this matter? It all matters because we care about imagining and materializing future habitable worlds. We care so much that finding effective mechanisms for creating these more habitable worlds really is our concern. Smart, creative, imaginative ways of linking ideas to their materialization really do matter, because the future matters, and we will use whatever means possible to do create these better worlds, including the simultaneous deployment of science, fact, fiction and design.



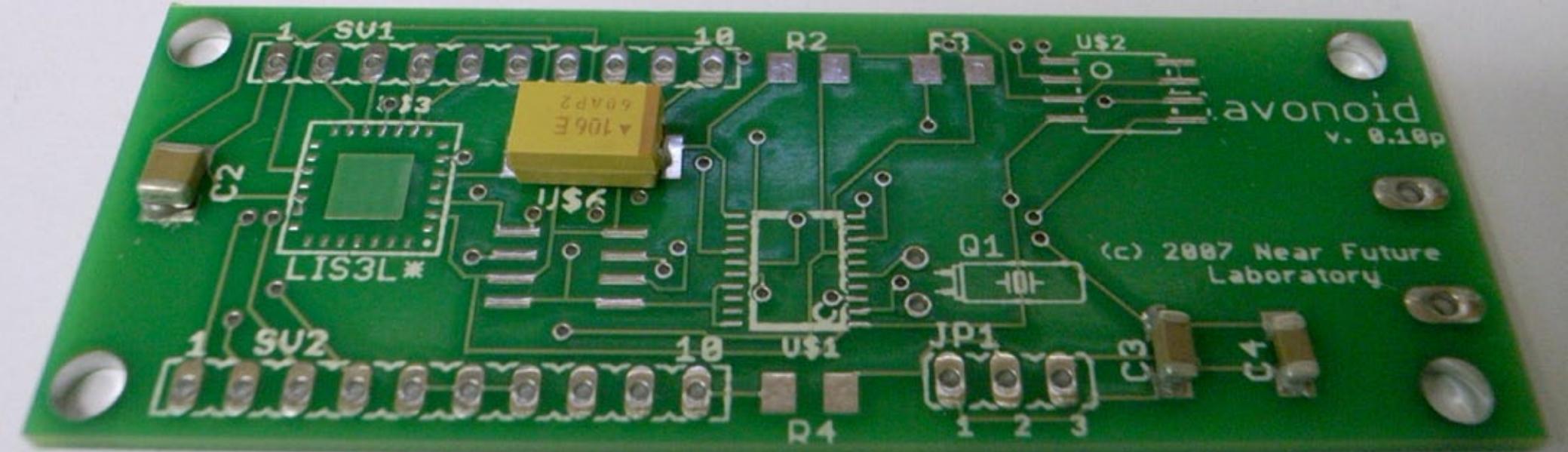
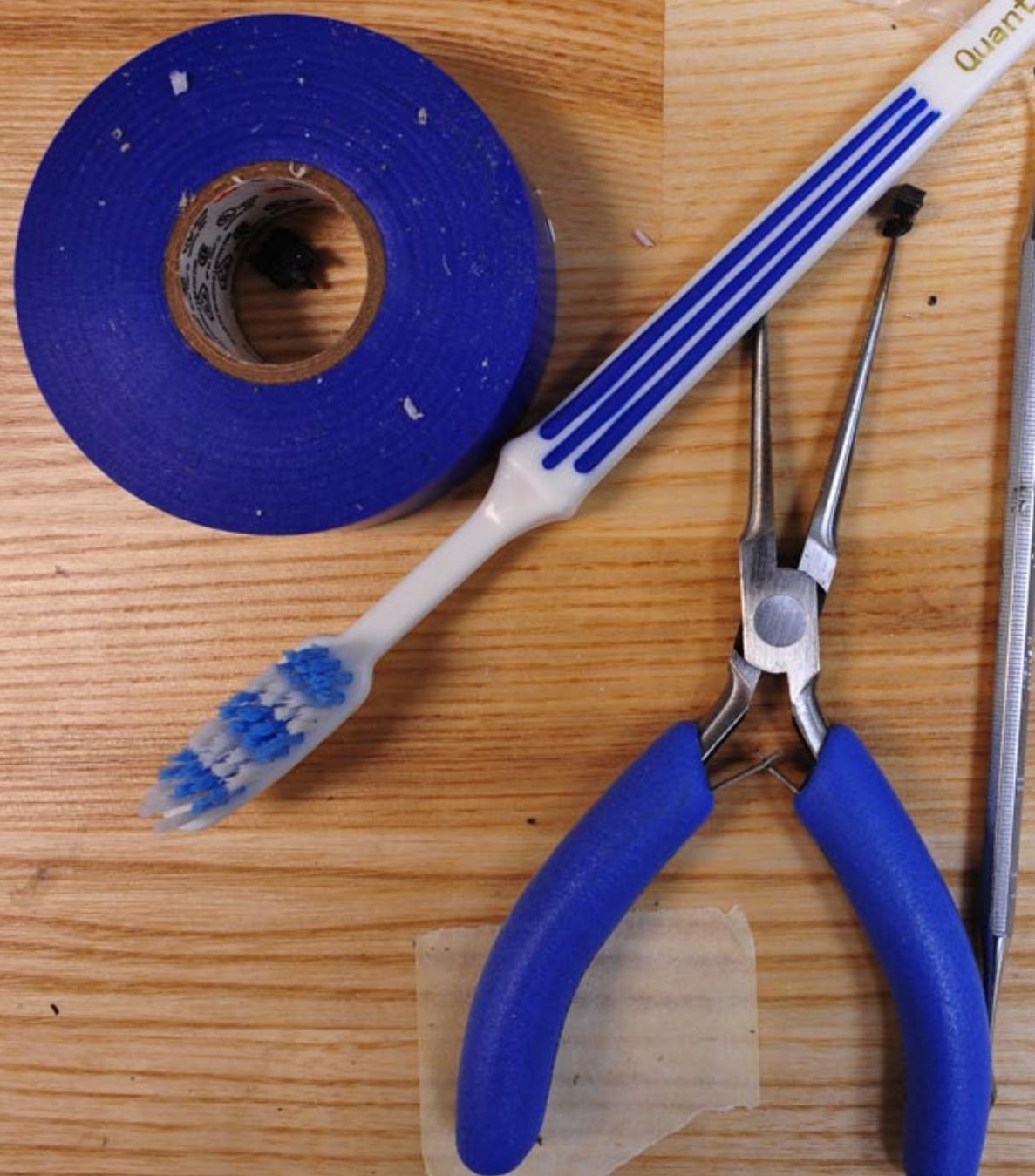


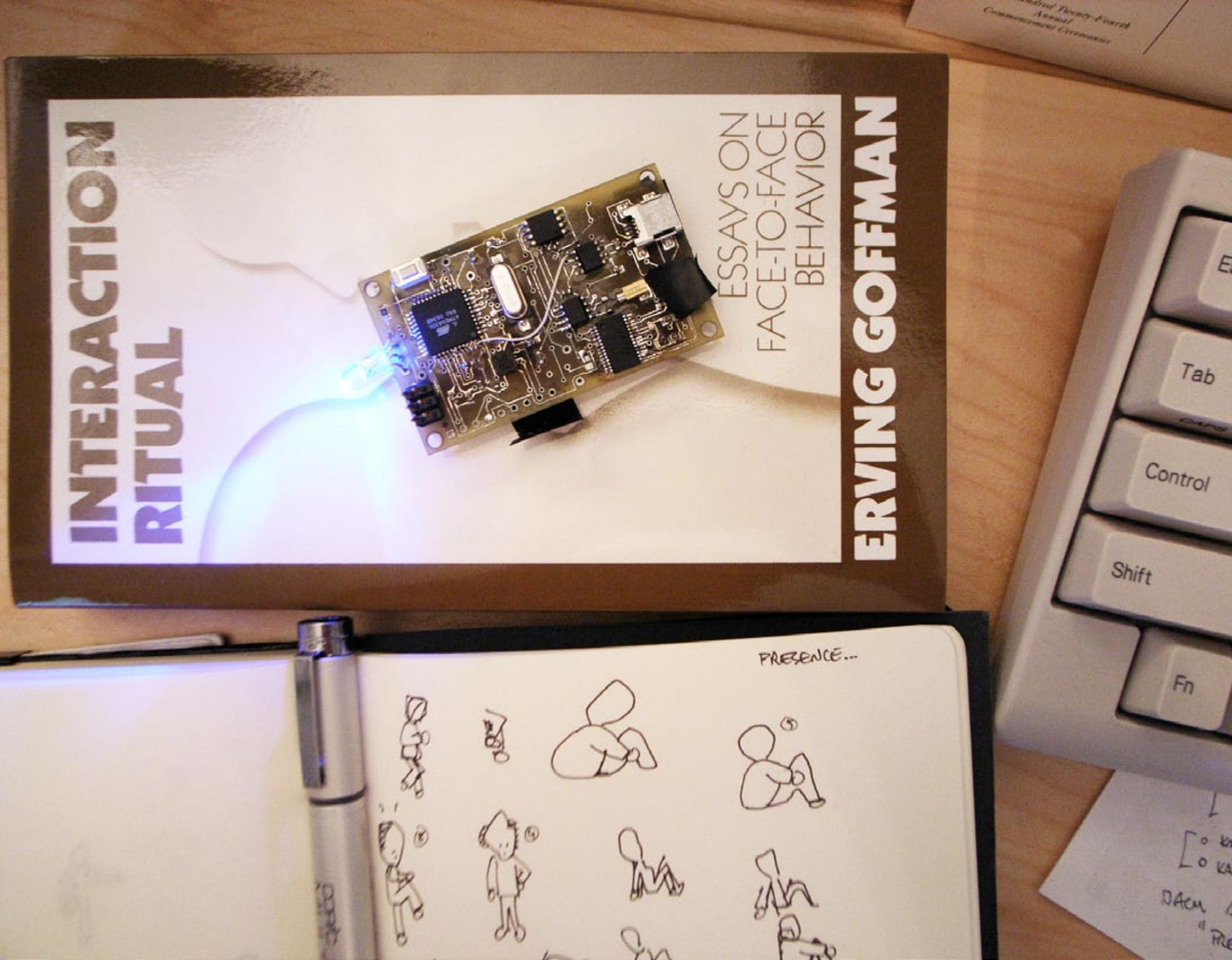
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