

Design Fiction: From Props To Prototypes

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Abstract

Thinking through fiction to comprehend the action of design is a way to invigorate what design could be, beyond the routine, everyday notion of what of design does. Designing with the impulses and motivations of fiction offers allows design can speculate in an articulate, writerly way — thinking through to the unexpected, unconventional, undisciplined and unheard-of. This paper lays out some theoretical and practical aspects of design fiction.

Keywords

design; science fiction; Star Trek; innovation; creativity; film.

A Technical Manual from the Future

Franz Joseph was an expert technical draftsman working in the aerospace industry in Southern California during the heady, "Skunkworks" days of the 1970s. He started a special project so advanced and speculative that it taunted belief. To call it "high tech" missed the mark by a few hundred years. The designs he was creating were beyond anything that had been done before. Laboring using traditional draftsman's drawing tools and without the aid of today's sophisticated illustration and computer-aided design systems, Joseph created a set of technical documents from the future, diagramming the details of technology so advanced and of such sophistication that the possibility of its existence teetered between fact and fiction. One wouldn't have been off the mark describing his work described the contours of the future. Indeed, his designs were so fantastic and seductive that when he published them In 1976, they became a New York Times best selling book.

Joseph's Technical Manual was a DIY shop manual for the science fiction world of Star Trek. It was a service and repair guide for tricorders, warp drive engine rooms and hand phasers. Using his practical skills as a draftsman Joseph was able to extend the science fiction of Star Trek, telling his own stories about that world through technical diagrams, political policy documents and engineering schematics. The imminent plausibility of his drawings created an entertaining, overwhelming reality effect. He played with our minds, entertaining us by blurring the broad line between fact and fiction.

A world with a Technical Manual has complex, fragile technology like tricorders and communicators and captain's chairs that gets used by people and break down and need repair. Technical diagrams of science fiction props that imagine them as real, everyday, objects forces one to imagine these devices in use. Even science fiction devices need service manuals because, in the fiction, they don't always work and must get serviced.

They get serviced because they get used — and broken from use. Like buried artifacts found in an archeological dig from the future, we are left to fill in the gaps and knit together the stories suggested by the peculiar objects he drew. Was a particular component in the first version of the tricorder susceptible to failure under the conditions particular to expeditions to, say — class K planets? These questions are precisely the sort that the Star Trek Technical Manual provokes, implicitly. In its own quiet yet powerful and evocative way it provides fuel for the imagination, making one think of a workbench somewhere in the year 2300 where a scrawny technician is puzzling over an intermittently functioning anabolic protoplaser or universal translator. Even fantastic, impossibly sophisticated technology has its ordinary, broken down moments.

Making the extraordinary ordinary is a recurring genre convention for science fiction. Because of its creative elasticity, sci-fi is able to make strange, implausible ideas mundane and everyday. The Technical Manual does precisely this, making the unreal seem real, even routine and plain. When it does this, the extraordinary becomes tangible and possible. We are drawn into the possibility that even our wildest imaginings can be realized. Whatever we can dream can happen. We can prototype a future with a good story and a hand full of evocative props.

A favorite example of this sort of reality effect is Michael Horn's short film "Death Star over San Francisco" in which the Galactic Empire visits San Francisco during Fleet Week. We see the almost banal spectacle of an Imperial Trooper, 10 meters up on an AT-ST poking his head out of the hatch and coaxing a passerby to toss up something they've dropped on the street, perhaps the keys to start the walker. Elsewhere we see an Imperial Transport Craft making a landing on the roof of an apartment building, as ordinary as anything you might see around San Francisco. The footage is rough and un-produced, with off-camera banter about barbecues and the rustle of wind on a microphone, clearing the way for us to imagine this as the product of an everyday tourist out and about during a holiday weekend.

Another example of a similar kind of reality effect is filmmaker Floris Kaayk's fictional documentary "Metalosis Maligna." Kaayk "documents" a disease that arises from the widespread proliferation of metal implants. Visually, it plays tricks on us, forcing us to consider the reality of this condition. By using the conventions of the documentary — talking head experts, dramatic footage of people suffering horrific metal lattices protruding from their bodies, reserved voice over commentary, and so on — we are drawn into the possibility of this slightly sinister malignancy. Our willingness to accept a strange, otherworldly circumstance is heightened by the visually compelling short story and its reflection of a familiar, sober medical news documentary style.

The brilliance of these short films lies in their own simple, almost naive proposition, which is similar to Joseph's specific kind of diagrammatic creative story telling. They all teeter playfully between fact and fiction. These design fictions stretch the constraints of reality by taking the genre conventions of technical drawing, hand-held holiday videos and news documentary and unassumingly fill out the contours of a slightly real, slightly fictional world. They allow for a different kind of engagement with a speculative idea. They draw it out, specifying it "as if" it were part of the world already. The Technical Manual, like "Death Star over San Francisco" lives somewhere in between speculation

and materialization, in between an idea and that idea put in the hand to ponder over and consider. The fiction comes off the screen just a bit and gets closer to reality.

Why do we get drawn in and allow the reality of the fiction to consume us to the extent that we ourselves begin to extend the story and fill in its contours? Because the props and their stories that they live within and the details of their design are evocative enough to draw us in, compelling us to wonder and imagine. Things become imminent in a really good design fiction and we cannot help but to consider their possibility. They are familiar enough to our everyday that they are legible, yet different enough that they suggest that things have changed slightly. This playful flirt between familiarity and difference means that the design fiction world has come from ours. We have made an investment in helping to tell the story and imagine the fictional world.

How does this happen? These design fictions exploit genre conventions suggesting that these objects exist. They are presented simply and without embellishment. The otherworldly, spectacular things are made quotidian and even boring by presenting them as matters-of-fact, everyday and perhaps even old news. Enjoying the stories that surround them means we become an observer in this world, identifying with the characters and their world in which the things we might otherwise find extraordinary are quite ordinary. Neither the story nor the characters fetishize what would otherwise be miraculous events, objects and experiences and so we relegate them to our mental catalog of the normal and the routine. The extraordinary becomes ordinary and, therefore, possible.

Design Fiction: New Practices for Making and Innovating

The Technical Manual makes me think about new ways of making, creating and prototyping. It would be useful in the design world to prototype things in a way that help us imagine and wonder and consider unexpected, perhaps transformative alternatives. Rather than the canonical engineering prototype that operates as a proof of technical feasibility, suppose we think about prototypes that are more like props? Material things, off the page and in the hand that help tell a story or start a conversation about how things could be different or a little bit better. They don't test in the technical sense, but probe the larger set of questions that inevitably surround new, provocative and transformative ideas. These design fiction props and prototypes would be things that help one imagine and tell stories about new near future objects and their social practices. Design fiction allows one to do the design work for things and ideas that are too speculative for reasonable, balanced people. They tell stories the same way a good science fiction does — immersive, imaginative and imminent.

This kind of prototype has nothing to prove — it does not represent technical possibility. The technical prototype serves the purpose of proving whether or not instrumental functionality is possible. Design fiction prototyping — or design fiction prop making — communicates possibility through the stories it evokes and the conversations it starts. The design fiction prototype helps the imagination's capacity to think beyond conventional assumptions about what comes next. It does not assume that innovation is about the same old stuff only now faster-smaller-brighter and better battery life. Design fiction helps throw out these assumptions and introduce new, alternative ones that form

the basis for new ideas, new methods, new contexts and new experiences. It does this by deliberately blurring the line between fact and fiction. Design fiction allows us to re-think and re-imagine what can be possible.

Design fiction prototyping fashions tangible, materialized story elements that are simultaneously speculative and imminently possible. Design fiction does not create specifications for making. Rather design fiction creates specifications for imagining. The design prototypes expresses possibility more powerfully than either fact or fiction could do if they were each left to their own intellectual and creative provinces.

Design fiction is a way to speculate seriously. It's not quite brainstorming, nor is it ideating. It is not only a way of introducing bizarre technology concepts — nanotech, picotech, radical atoms, painted bits. It is also a way to begin conversations that question assumptions about what the future is for, what it contains, and what counts as an advancement "forward" towards a better, more habitable near future world. In the way that science fiction is able to hold a mirror up to society and raise questions about where we are and where we are going, design fiction can do likewise.

The Future Can Be Otherwise

The continuing-advancement fiction, close cousin to the idea that things are always getting bigger, smaller, brighter, cheaper — the "up and to the left" model of evolution — is an unyielding force of capital that propels itself by the flows of ambition, desire and hubris. Because we are engaging science fiction, and because we are engaged in the practice of design, design fiction can break with this model of scientific and technological advancement and materialize alternatives. Design fiction allows for ways to explore different underlying assumptions. It finally allows us to insert subplots and exceptions that play out different possibilities for the future.

Design fiction does this by using design to tell stories. It creates material artifacts that start conversations and suspend one's disbelief in what could be. It's a way of imagining a different kind of world by outlining the contours, rendering the artifacts as story props, then using them to imagine new possibilities. The prototyping/prop-making activates the idea, giving it a few material features and some density, and forcing the refinement and consideration that comes from making something material. A design fiction could be as simple as an object that proves curious enough to ask questions about, or to ponder over with the hand and eyes and imagination. The object talks to us, inviting us to fill in the larger story about where it comes from, how it operates, who possessed it and why.

That in-between is what Franz Joseph captures in his Star Trek design-fiction mechanical drawings. The sparseness of words contrasts with the drawing details in such a way that one wonders about the implicit sophistication of these devices. Are they real? Where and when did this manual come from? Questions and conversations might follow. This is the seduction of design-fiction at its best. The reader has to fill in the gaps and in the filling-in of gaps, we are made to imagine and wonder. And with these questions evolves a conversation that does not stop simply at the pragmatic, and does not dismiss as silly or impossible the fruits of imagining.

Joseph's drawings are not just technical specifications or paper prototypes — they are little story elements like props materialized to help flesh out a story, add creative seasoning to Star Trek and help bring it all to life more completely for the story's fans. The canonical, engineering prototype is something else — a test of translations and articulations of ideas in material. Joseph does something different here. He is helping to tell a story by extending it and adding to it. He is designing with fiction.

We might wonder why other "real" engineering drawing and prototypes and specification sheets do not become New York Times bestsellers?

Why Science, Design, Fact and Fiction?

Science fiction can be thought of as a story telling genre that creates prototypes of other worlds, other experiences, other contexts for life all based on the creative insights of the author. Whether a world elsewhere in the universe, or one that is ours only with shifts that displace it in time or culture, science fiction plays with our minds by shifting our point of view. Oftentimes it will do this with props — objects and devices and affordances that help transport us and shift our gaze to another time, and another technocultural world. The props that live in these stories are objects brought to life in the fiction. At the same time, they sustain the story, providing the contours, plot pivots and ornamentation necessary to the drama. They specify the broader technocultural milieu in which the story takes place. They make the technology make sense not as instrumental functionality, but as an expression of human cultural practices. The best of science fiction turns the technology into a lens through which we are forced to look at a present state of affairs, or a possible future we are heading towards. Science fiction is cultural criticism done through a story. It is expected that a science fiction will speculate about the role that science and technology play in our lives. Science fiction can ask — what if? And then proceeds to answer that question with an allegorical story. It seems to me that this is a vital characteristic that can be borrowed and extended for design.

This is the way that science and design and fact and fiction collapse together. They all wonder what a world would be like, if.. They all spark conversations that wonder and compel us to imagine things otherwise.

Design fiction creates speculating objects. It creates conversation pieces, with the conversations being stories about the kinds of experiences and social rituals that might surround the designed object. The objects speak to us by forcing us to ask questions of them, and the world in which they might exist. Design fiction objects are totems through which a larger story can be told, or imagined or expressed. They are artifacts from someplace else, telling stories about the other worlds from which they come.

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. It often lacks the precision we would like. How to express an idea that lives in the imagination? Materializing it in some fashion helps — getting it in the hand, in some way to have something to point at and ponder over and discuss. This is why these design fiction "conversation pieces" can be useful material. They can be designed to provoke

the imagination and open up a discussion so as to explore possibilities and provoke new considerations that words by themselves are not able to express. This is heady stuff, but even in the simplest, vernacular contexts, such stories are starting points for creative exploration.

Design fiction is a way of exploring different approaches to making things, probing the material conclusions of your imagination. Design fiction removes the usual product design constraints that appear when designing for massive market commercialization — the ones that reasonable people in blue shirts and yellow ties call “realistic.” This is a different genre of design that is forward looking, beyond incremental improvements. It makes an effort to explore new kinds of social interaction rituals, relay new possible assumptions and principles that may yield simple new ideas that might count as innovative. Design fiction provides a more compelling way to communicate possibility. As much as science fact tells you what is and is not possible, design fiction understands that constraints are infinitely malleable.

From Idea to Materialization: Using Props or Prototypes

An idea will find its expression, whether it is content to circulate as a conversation or restlessly seeks a more materialized form. Making prototypes is a way to extend an idea into its materialization. Prototypes move ideas out of the mind off the page and into the hand. We prototype to render and materialize ideas so that they can be shared and tested and allowed to circulate. They are plastic and malleable and can be expected to change both themselves and the larger set of circumstances in which they exist. Prototyping renders an idea with a different degree of fidelity than can be expressed by sharing thoughts prior to their materialization.

In the world of engineering and technology, the prototype is a way to test the translation of technical specifications into their pragmatic, material form. The prototype is a way to survey the material complexities of an idea — how do electrical components behave together in such-and-so configuration? Do they stick to the expected functionality as described in the specification?

The specifications are a step along the way to the idea's materialization. The specification makes the idea terse and less open to speculation. It is an engineering ritual and part of the language of a technocratic world to specify an idea in the genre conventions of the "spec." Engineering prototypes are the penultimate materialization of a collection of nearly endless discussions and circulations of documents, deployments of resources and expenditures of time and energy in order to move an idea from itself and get it off the page and in the hand. Think of the exhaust produced from the expenditure of intellectual, creative and bureaucratic energy to translate an idea into its material representation. This translation is a reforming of the moments of inspiration into its solid state. The tests of this translation is the engineering prototype, the refinement of the idea in material — oftentimes a refinement that lands far from the original idea.

The prototype is a way to test the feasibility of materializing the idea. This test questions the specification of the idea, probing its consistency with the underlying assumptions.

Do the paper description of the functional specification render themselves properly when brought closer to the atomic configurations of silicon, copper, mechanical servos, light-emitting pixels and so that are collectively meant to represent the idea? Does it all work together? Can the idea be effectively translated into a material form that can be assembled with the necessary parts? Do the parts even exist, or must they be themselves newly made according to the demands of this new idea? Must new machining and assembly practices be developed? And so on. The prototype places demands on an idea that refine it and challenge its feasibility. These challenges naturally constrain what ideas can be considered which implicitly defines the boundaries of what is fact and what is speculation or fiction.

The prop lies at the other extreme. It is closer to fiction than fact. It helps tell a story by moving it forward. It is like Hitchcock's MacGuffin, an object that exists mostly to provide the impetus to tell a story. Design fiction does something in between the prop and the prototype. The design fiction object speculates about what could be without expecting that the ideas in the fiction will materialize in the same pragmatic form as a prototype. But like the prop it can provoke a conversations about what could be. The prop has the disadvantage that you cannot expect the same level of pragmatic materialization as the prototype. It has the advantage that props can inspire a different sort of "specification" — the conversations that activate the imagination, testing assumptions and provoking a wide range of explorations that include a variety of disciplines beyond the technical. The design fiction object circulates back and forth between prototype and story prop, influencing, challenging, questioning, blurring fact and fiction.

This is an idea that is explored in the technical paper "A Survey of Human-Computer Interaction Design in Science Fiction Movies." In it the authors survey the way science fiction films "cite" current or speculated computer interface technologies. They are equally curious as to the ways that scientists and technologists use science fiction film as reference points and inspiration for their "real" science work. The paper describes a few examples of this circulatory loop between science fiction and science fact, each feeding off of the other to produce an intertextual conversation that may not be formal, but occurs nevertheless.

A more generalized and analytic description of this circulation of technology-based ideas and conversations is found in a forthcoming book chapter from David A. Kirby called "The Future is Now: Diegetic Prototypes, and the Cinematic Creation of the Future". In it, Kirby, a historian and sociologist of science and technology, explains how science fiction film can be a way to prototype new ideas. He calls this the "diegetic prototype." We might think of this as closer to the prop, only it is not quite inert. It still belongs to the realm of technology and technical product development because it is a kind of prototyping, only it uses the full resources of a science fiction film production as the test apparatus. Moreover, the idea behind the prop/prototype can be circulated to a very large audience — those who see the film — effectively clarifying visually and with a story what might be a rather confusing concept for a lay audience.

Kirby uses the example of the Spielberg/Cruise/P.K. Dick film "Minority Report" in which the idea of gesture-based computer interfaces are demonstrated within the tangled briar of a dramatic, science-fiction chase film. Kirby points out how the engineer John

Underkoffler was able to use his role as a technical advisor for the film to evolve his own ideas about free-hand gesture interactions. In this role Underkoffler developed a set of principles, a gesture language, and some visual features that served the dual purpose of visual theater for the film and technical prototyping for Underkoffler's entrepreneurial ambitions. The film production becomes a unique resource for prototyping an idea by putting it to the test and giving it some context within a story. It also provides a reference point for a larger public understanding about what may be a possible extension of today's computer-human interfaces — shakeable, tilt-able, Nintendo Wii-like gesture interfaces — into the year 2050 when the "Minority Report" drama takes place. Certainly one amongst a variety of very good reason why the Nintendo Wii has become legible as a cultural artifact and interaction practice owes a debt to the gestural interaction scenes in "Minority Report." Explaining what "gesture interface" means is much of what the film has provided to its audience, perhaps even more so than the central plot of power, corruption and an evolution of the capacity of the human mind to visualize the future.

Compared to a typical, staged technology demo, the diegetic prototype elevates the context by placing it within a larger fictional world. It is not the central attraction so much as a signpost indicating that things are a bit different. We can imagine the device more completely and are less likely to dismiss it, as might happen if it were presented as another tech gizmo absent a larger set of contexts and meanings. It is present, demonstrable and extant within the diegesis of the film. We have been prepared to accept what we see, particularly in a good fictional drama because we would rather enjoy ourselves and accommodate the vagaries of a good story's speculations than dismiss it and step outside of the drama.

Kirby's diegetic prototype is like a concept prototype, only with the added design fiction property that there is a story that surrounds it rather than a drape of test equipment and puzzled engineers. The story — the science fiction — probes and verifies the concept and perhaps even enlivens it in a way that an engineer could never do the way a well-written story could. The story is more than a "user scenario" or a functional specification — which is itself also a kind of story, albeit terse, technical and lacking in drama. In a diegetic prototype, the characters are richer than scenario personas or marketing archetypes of humans. No one ever refers to people as "users" or "segmentation models" in a good science fiction story.

What good is the diegetic prototype? The diegetic prototype provides an opportunity for a technical consultant to speculate and extend their ideas within the fictional reality of the film, considering their work as more than a props maker or effects artist creating appearances. It is a prototyping activity as valid and committed as the action of a technologist specifying the functionality of their idea, only the materialization is represented in a story that is shared by an audience of millions rather than a few people involved in the development of some new gizmo. The film 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)

Kirby provides us with a fascinating insight. He is saying that a good story with its props may be a more effective at materializing an idea than an engineering prototype. We might wonder why more engineers are not drawn to story telling as a way to prototype their ideas, rather than circuit building or software prototyping. As a means to communicate and disseminate an idea, not much works as well as the circulation of a compelling story. Hollywood and the entertainment-media network has taught us this much, at least.

Conclusion

Collapsing ways of making and prototyping with ways of imagining and telling stories may seem to stretch what is reasonable for the practical aspects of design. But, the opportunity for exploring new, even unexpected potentials introduces the possibility that designing with the genre conventions and story-telling idioms of science fiction may introduce a new kind of innovation practice.

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