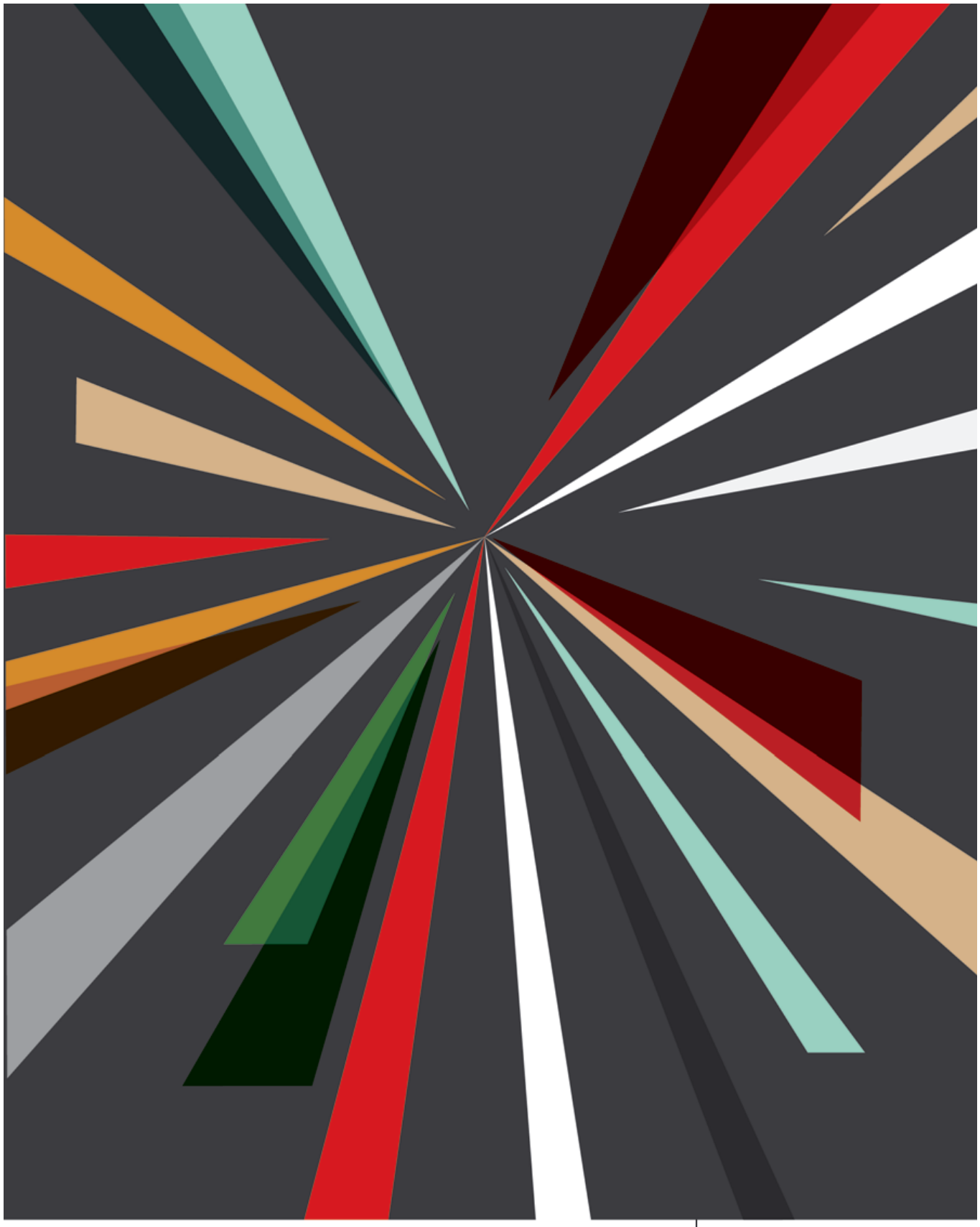

MAKE IT SO

Interaction Design Lessons from Science Fiction

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Why Look to Fiction?

With a working category of sci-fi and having decided what to focus on, we next ask the question: Why look to fiction for design lessons at all? How can it inform our non-fictional, real-world design efforts?

One answer is that, whether we like it or not, the fictional technology seen in sci-fi sets audience expectations for what exciting things are coming next. A primary example is the *Star Trek* communicator, which set expectations about mobile telephony in the late 1960s, when the audience's paradigm was still a combination of walkie-talkie and the Princess phone tethered to a wall by its cord. Though its use is a little more walkie-talkie than telephone, it set the tone for futuristic mobile communications for viewers of prime-time television. Exactly 30 years later, Motorola released the first phone that consumers could flip open in the same way the *Enterprise*'s officers did (Figure 1.1). The connection was made even more apparent by the product's name: the StarTAC. The phone was a commercial success, arguably aided by the fact that audiences had been seeing it promoted in the form of *Star Trek* episodes and had been pretrained in its use for three decades. In effect, the market had been presold by sci-fi.

Another answer is that with media channels proliferating and specializing, common cultural references are becoming harder and harder to come by. Having common touchstones helps us remember design lessons and discuss ideas with each other. Sci-fi is a very popular genre, and the one in which speculative technology is seen most often. If you want to discuss an existing technology, you can reference a real-world interface. But to discuss future technologies, it's easier to reference a movie than to try to define it a priori: "Kinect is, you know, kind of like that interface from *Minority Report*, but for gaming."

FIGURE 1.1a,b
Star Trek: The Original Series (1966); the Motorola StarTAC (1996).

A last answer is that interface makers in the real world and in sci-fi are, essentially, doing the same thing—creating new interfaces. In this sense, all design is fiction—at least until it gets built or is made available to users and customers. When designers create anything that isn't the real, final product that ships, they're creating speculative interfaces—fictions. Each wireframe, scenario, pencil sketch, and screen mockup says, "Here's how it might be," or even "Here's how it ought to be." Designers for each domain ask similar questions: Is this understandable? What's the right control for this action? What would be awesome? Although they ultimately work with different audiences, budgets, media options, goals, and constraints, the work is fundamentally similar. Each can learn something from the other.

The Database

Once we had a set of movies and TV properties to review (see the complete list online at www.scifiinterfaces.com), we watched and evaluated everything we could get our hands on. We entered screenshots and descriptions into a custom database, which formed the basis for our investigation. This database is also available on the website, where you can make your own contributions and see much of the content that could not fit into this book.

Finding Design Lessons

Armed with this tool, we then identified what we could learn from the interfaces. There are four ways we go about this.

Bottom Up

To learn lessons from the bottom up, we investigated an individual interface in detail. To do this, we need an interface whose use we understand and that has sufficient screen time to allow us to analyze its inputs, compare these with its outputs, and evaluate what works for the user in accomplishing his or her goal. If it doesn't work, we may still be able to learn a lesson from a negative example. If it does work, we can compare it to any similar interfaces we find in the real world to see what might translate. The things that can translate are captured as lessons, and we can later look for other examples in the survey that support or refute it.

Top Down

To examine the survey from the top down, we tagged each description in the database with meaningful attributes. The example in Figure 1.2 shows a set of tags for the write-up on the wall-mounted videophone seen in *Metropolis*.

Description: Joh verifies that he's seeing the correct channel visually when he sees Grot's nervous pacing in camera view. Confident that he's calling the right place, Joh picks up a telephone handset from the device and reaches across to press a control on the right. In response, the lightbulbs on Grot's videophone begin to blink and, presumably (it's a silent film), make a sound.

Tags: analog, calling, communication, dial, dials, filmmetaphor, hangingup, hangup, messages, printedoutput, telephone, telephony, tickertape, tuning, turningoff, videophone, wallmounted, wristroll, wristtwist

FIGURE 1.2a–c
Metropolis (1927).

With the interfaces in the database tagged, we looked at the aggregated tag cloud to see what stood out. We then drilled down into the tags that appeared most often: *glow*, *screen*, *red*, *blue*, *video*, and *holography* (Figure 1.3). We then tried to explain why the tag appears so frequently, compared the interfaces similarly tagged, considered their commonalities and differences, and compared them with interfaces in the real world.

FIGURE 1.3
This tag cloud, created using tools at Wordle.net, illustrates the major top-down themes.

Chasing Similarities

Another way to glean design lessons from the survey is to notice and pursue personally observed similarities between properties. For example, fans of gestural interfaces may have noticed similarities between the controlling gestures appearing in completely different movies and TV shows, from different writers and even different studios. What's going on here? Since there's not a gesture czar calling the shots, what's underneath these similarities? Are they coming from existing interfaces, common sense, or somewhere else? Investigating questions like these is something of a top-down approach, but it comes from pursuing particular questions rather than letting the questions emerge from the tags. (See Chapter 5 for some of our answers to these questions about gestural interfaces.)

Apologetics

One of the most rewarding techniques is *apologetics* (we're borrowing the term from theology). When we found an interface that couldn't work the way it was shown, we looked for ways to "apologize" for it; that is, we thought of ways that the interface *could* work the way it was depicted. In a few cases, this led to some interesting insights about the way technology *should* work.

One example of this comes from *2001: A Space Odyssey*. From an Earth-orbiting space station, Dr. Floyd has a videophone conversation with his daughter back on Earth. During the scene, we see the young girl's hands mash on the keypad of the phone, but the call isn't interrupted (Figure 1.4). Although this may have been an oversight on the director's part, it is nonetheless the way the system *should* work. If the system knows that a child is using it and the button mashing is likely unintentional, it should disregard these inputs and not interrupt the call. Although this presumes sophisticated technology and an interface idea even the film's producers probably didn't think about, we can still use this principle even as we work with our real-world technology today.

FIGURE 1.4
2001: A Space Odyssey (1968).

This technique, more than any of the others, may have pragmatic readers scratching their head, and asking if sci-fi interface designers really put as much thought into their creations as we have in examining them.

It's entirely possible that they don't, that sci-fi interfaces are a product of pure inspiration, produced under tight deadlines with little time for research or careful reflection. But to be of use to us who *are* able to reflect on the interfaces we create, we have to examine them as if they were produced exactly as the designers intended them to be. It's a choice you have to make when writing critique, an issue referred to in literary circles as *authorial intent*. We chose to look at the interfaces without trying to reverse-engineer intent. If we didn't, we might get spun out on vicious cycles of second-guessing.

We used all of these techniques in the development of this material. The bottom-up approach provided many individual lessons. The top-down approach provided a reliable path through the vast amount of material we had to work with, and provided much of the structure of the book. Chasing similarities resulted in a few particular chapters, like Volumetric Projection (Chapter 4) and Gesture (Chapter 5). Apologetics resulted in the most satisfying results from the material, though, because we had to use what worked right from a narrative stance—a human stance—to arrive at new interaction design ideas. We couldn't count on finding these opportunities in sci-fi, since we had to wait to find "mistakes," but we could take advantage of them when we did.

The Shape of a Lesson

When capturing lessons, our goal was to provide them in a useful format. We want them to be easily spotted as you read or skim through the material, so they are set off in green type. The titles of the lessons are written as unambiguous imperatives, so their intended lesson is clear. We've included a description in accessible language that calls out nuances, extends the examples, and describes when the lesson is applicable.

Sometimes, the analysis points to something that wasn't seen in the survey. These particular lessons are called out as Opportunities, but are otherwise similar in appearance.

Finally, we gathered together all of the lessons in an appendix at the back of the book so you can find a particular one more easily and consider them as a set.

Finding Inspiration in Science Fiction

In the year 2000, Douglas Caldwell was successfully petitioned by his teenage son to see the film *X-Men*. Douglas wasn't really a fan of sci-fi, but wanted to spend time with his son, so he agreed to go. Watching the film, he was amazed to see a solution to a 2,000-year-old problem that he dealt with every day.

In a scene near the climax, the X-Men are gathered around a large display surface, which looks something like a circular, metallic tabletop. As Cyclops describes the mission they are about to undertake, the map changes shape, as if it was made of hundreds of tiny pins, each rising and falling to form the topography needed (Figure 1.5).

The reason this speculative technology was so important to Douglas was that he worked for the US Army Topographic Engineering Center. Part of his job was to create 3D maps and ship them to generals in the field, so they could study the theater of battle and consider tactics. These maps are called "sand tables" because they were originally created by generals thousands of years ago using actual trays of sand. Military leaders still do the same thing when they don't have a better map on hand (Figure 1.6).

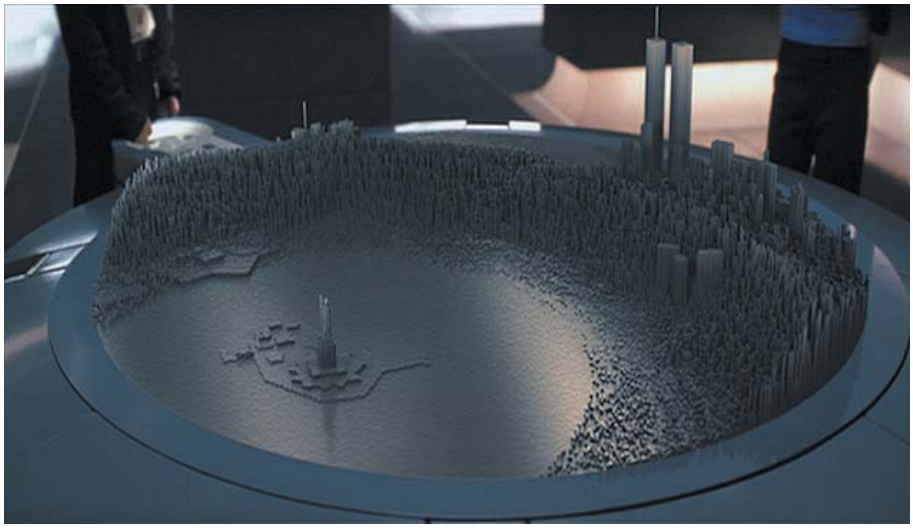

FIGURE 1.5
X-Men (2000).

FIGURE 1.6
President Lyndon Johnson consulting a sand table of Khe Sanh during the Vietnam War.

The main problems with modern 3D sand tables, while very accurate, are that they're expensive, static, somewhat delicate to transport, and useless if you guessed the wrong terrain.

The animated pin board Douglas saw in *X-Men* solved a number of these problems all at once. Such a table could depict the topography of any location in the world, at any scale, at any time, and a general would ideally only ever need one.

When he went back into work, he immediately wrote a request for proposal that referenced the scene in the film, so that military contractors would be inspired in the same way. One of the companies responding to the proposal, Xenovision, was awarded the development contract and, four years later, developed a working model: the Xenotran Mark II Dynamic Sand Table (Figure 1.7).

FIGURE 1.7
The Xenotran Mark II Dynamic Sand Table, with its top raised.

FIGURE 1.8
A still from a video showing the Xenotran Mark II Dynamic Sand Table with active topography and projected satellite imagery.

The Mark II independently moves small metal rods that, together, create a new surface, much like what is implied in *X-Men*. Alone, this solution closely matches the technology implied in the film. While in development, though, the team took the concept even further. They covered the pins with a thin, white rubber sheet and vacuum-sealed it to create a smooth surface across the pins. Then, they projected imagery onto the surface from above, creating topography in full relief, with up-to-date satellite imagery and overlays of data (Figure 1.8). All of it can change over time, to create realistic, animated surfaces, depict tsunamis traveling across the sea, or even show landscapes shifting over geologic time.

The main lesson from this story is that the technology might never have been developed if Douglas hadn't seen the film.

LESSON ***USE*** **SCIENCE FICTION**

Sci-fi, with its ability to present design fictions of speculative technologies with only narrative constraints, can do more than entertain us. It can inspire us with what's possible, what's ideal, and what would just be plain awesome. This book is meant to encourage you to look at sci-fi in the same way and come away inspired and ready to change the world.

Let's Begin

Now that we have outlined our constraints, explained our intentions, and gotten the coordinates from the navicomputer, let's make the jump to light speed.