

### **Magic May Be Magic No More...**

**Jeffrey R. Harrow**  
Principal Technologist, The Harrow Group

The new Harry Potter book recently hit the shelves, and flew off them at an unprecedented rate -- not on broomsticks but in the hands of millions and millions of adoring fans young and old. One of the reasons for Harry Potter's popularity is that these stories transport readers into (some say) an alternate existence where Wizards and Witches have learned to tap energy and capabilities denied to "normal" people (muggles).

Harry's world, like ours, can sometimes be mundane, such as having to deal with family problems. Of course magic gives Harry unique abilities to deal with these issues - abilities that you and I might wish for on occasion. For example, the ability to turn annoying relatives into balloons and watch them waft away on a gentle breeze.



This is something you and I can't do (probably a good thing.) But there are many other magical things that Witches and Wizards in Harry's world take for granted that may *NOT* be so far out of our reach:

#### **Invisibility Cloak.**

The "Invisibility Cloak" is certainly useful, helping Harry to explore the off-limits areas of Hogwarts to learn important clues, and to take appropriate actions, literally under the noses of those who have fallen to the dark side. (We'll assume that Harry only uses his invisibility cloak for "greater good" purposes, of course...)

But Harry's cloak is now falling to *OUR* "magical technology!"



This picture above isn't a shot from Harry's next movie, but shows a working prototype of "Optical Camouflage" from the lab of [Susumu Tachi](#), Professor of Information Physics and Computing of the Graduate School of Info. Science & Technology, University of Tokyo! (You can get a much better feel for how this works by playing the short [MPG movie](#).)

According to Dr. Tachi,

*"[This invisibility cloak] is made of retro-reflective material so that the coming light is reflected back to the same direction that it comes from. Microscopic beads on the surface of the coat have the function of retro-reflection. A half mirror makes it possible for a spectator to see virtually from the position of the projector. An HMP projects an image of the background scenery captured by the video camera behind the camouflaged subject. A computer calculates the appropriate perspective and transforms the captured image to the image to be projected on the subject using image-based rendering techniques. Since the cloak the subject is wearing is made of a special retro-reflective material which reflects the incident light [in] the same direction it comes from... an observer looking through a half mirror sees a very bright image of the scenery [behind the subject] so that he [becomes] virtually transparent."*

A paper of Dr. Tachi's describing this technology can be found [here](#).

So, the magical invisibility cloak is, er, fading, to the reality of our science.

### **Marauder's Map.**

Another example of Harry's magical toys is his Marauder's Map; it displays his location, as well as those of Hogwarts' other denizens, in real-time.



But -- wait a minute. You and I might not be able to float annoying relatives away but we certainly do have real-time moving maps that track the location of people, cars, planes, and the like (tracking broomsticks, however, requires a special add-on.) In fact, our moving maps can work as well as Harry's Marauder's Map with the exception that GPS doesn't have the magic to work inside most buildings (or within Hogwart's dungeons).

At least not yet. Because a number of technologies are maturing to allow us to peg location *without* having a good view of the sky.

We all know that our cellular phones, by dint of how cellular networks work (a dense mesh of cellular sites that can triangulate any phone's location to a greater or lesser degree, depending on many factors), leave our location footprints across the cellular log files. [This technology](#) can easily identify which building we're in, and depending on the cellular coverage in a given area even inside building to a limited extent.

Cellular signals, though, are relatively weak which limits their range and penetration. Local broadcast TV and radio stations however, pumping out hundreds of thousands of watts and specifically designed to penetrate building, will often work indoors. Apply a few modifications to encode precise time signals (similar to GPS) into these penetrating broadcast signals, and location information could be gleaned in areas where [cellular signals fear to tread](#).

There are also investigations into the potential of launching a new breed of far [more powerful GPS satellites](#) whose signals might break through many of their current limitations. Although these higher-level signals might initially be restricted to military GPS receivers, that was also the case with the original GPS system...

So Harry's map isn't quite as mystical as it might seem at first blush -- with the important exception that unlike Harry, we can't fold our moving maps into the pockets of our robes...Yet.

**Harry's Pictures.**

[www.futurebrief.com](http://www.futurebrief.com)

Several technologies are in the labs or being tested in the marketplace that seem likely to let us, too, fold our "magical" electronic displays as Harry can. Take, for example, Harry's "pictures" which, in whatever form, move and exhibit a life of their own even if folded into a pocket or rolled into an issue of the Daily Prophet newspaper.



Of course we already do have "[moving pictures](#)" that can be displayed in tabletop frames,



on [wall displays](#) such as LCD TVs when they're not being used as a TV,



and even on [pocket media devices](#) such as this Archos Gmini 400.



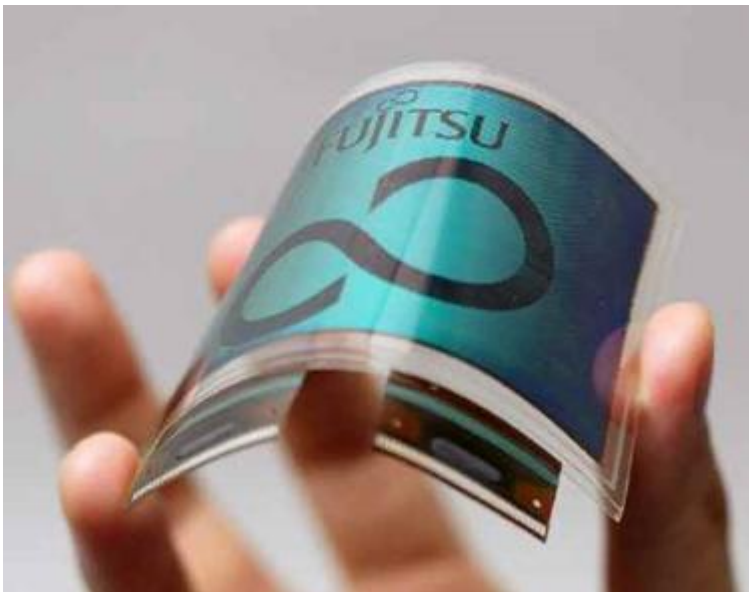
Still though, if we were to fold any of these displays as Harry does, we'd hear that awful cracking sound as the fragile, rigid display displays its last.

But it's clear that even Harry's foldable displays may become commonplace in less time than we might imagine.

For example, in 1999 E-Ink tested several elegantly flexible wirelessly updatable signs in J.C. Penny stores.



More recently, Fujitsu has demonstrated a lab implementation of a [flexible display](#) which retains its sharpness even when bent.



Similarly, Bridgestone has developed "[Electro Liquid Powder](#)" based e-Paper for, initially, live price tags for retail store shelves,



and SiPix is already producing an active matrix (fast response time) version of [e-Paper](#).



So yet again, Harry's magic may soon be magic no more.

#### **Time Machine.**

Finally, let's explore Time Travel. In Harry's world some wizards can, to some extent, travel through time.

In our world, time travel has been a most fertile ground for both Science Fiction and Fantasy writers to explore the fascinating 'what ifs' and paradoxes that time travel might uncover. But in many peoples' minds time travel is perhaps *LAST* on their list of "magical" capabilities that might ever come true.

We don't yet have a viable time machine. But Amos Ori, professor of physics at Israel's famous Technion University believes that the laws of physics as we currently know them do *NOTPROHIBIT* time travel!

He says, in a [July 27 article in USA Today](#), that:

*"I write (the situation) mathematically. That doesn't mean that I know how to implement it practically.' However... if inhabitants of some highly advanced civilization could set up the conditions... they might be able to travel in time."*

[www.futurebrief.com](http://www.futurebrief.com)

He has written a mathematical model that, he says, defines the conditions under which time travel could occur. Note that unlike most other time travel theories, Ori's is not presupposed on finding arcane things such as "negative energy." Instead, he just requires,

*"...absolute emptiness -- a vacuum. ... That means that, in principle, a closed, timelike curve could even happen naturally, possibly through cataclysmic astronomical collisions in the abyss of space."*

Without some currently unexpected breakthroughs, time travel does not appear to be in our near future. Yet even without such breakthroughs, if something *CAN* be done then I truly believe that incredibly brilliant people will continue to worry such a problem like a bone -- until it *IS* done.

It does seem improbable. Yet this interpretation of our universe seems to open that very door -- for stepping forward or back.

### **So It Has Been, And So Shall It Be...**

The continuous transitions from Science Fiction and Fantasy, to reality, represent a centuries-long and accelerating trend. Yet only in the past hundred years, and ever more-so in the past 35 years, have so many new realities shown up so quickly that the trends have become obvious within a lifetime (and now within a few years). Consider the telephone; electricity; airplanes, spacecraft; walking on the Moon; sending robots to Mars; plastics; computing; nanotechnology; medical advances; the Internet. These advances and many more are straining Sci Fi and Fantasy authors' imaginations. But that's a good thing, since as they dream up ever-new fictional, "impossible" ideas, their stories continue to shape the people who will later 'make them so.'

If we were able to show *ANY* of today's realities noted above to the most educated and far-thinking scientists of only 150 years ago, they'd quickly laugh us out of the room. Similarly, if we brought one of those folks into our time, the world around them would, indeed, be magic. Arthur C. Clarke put it so well:

*"Any sufficiently advanced technology is indistinguishable from magic."*

Indeed, what seems to be magic today and tomorrow will continue to fall from that lofty perch into our businesses, our homes, and our pockets. Whatever governmental and business policies that we can implement to foster such developments will help cement our global competitive advantage during the coming decades. It's a matter of staying at the top of the global pecking order. Or not...

Don't Blink!

*This essay is original and was specifically prepared for publication at Future Brief. A brief biography of Jeff Harrow can be found at our main [Commentary](#) page. Other essays written by Jeff Harrow can be found at his [web site](#). Jeff receives e-mail at [jeff@theharrowgroup.com](mailto:jeff@theharrowgroup.com). Other websites are welcome to link to this essay, with proper credit given to Future Brief and Mr. Harrow. This page will remain posted on the Internet indefinitely at this web address to provide a stable page for those linking to it.*

To download a PDF version of this essay, [click here](#). Please feel free to share the PDF with others who may be interested. To hear about future **Commentary** essays, take a few seconds to read about [Daily Brief](#), one of the "briefest" Internet updates offered anywhere.



[www.futurebrief.com](http://www.futurebrief.com)

© 2005, Jeffrey Harrow, all rights reserved.