

## **DECORATING CYBERSPACE**

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Email correspondence from various sources.

### **Make It Warm (William)**

Its amazing enough, perhaps, that cyberspace exists in any form, and that we'll be standing in it soon. However, I believe that whatever we demo is going to be taken quite literally by the people who experience it. What we show them will BE cyberspace for them. It seems important to make an inviting impression that also accurately represents the potentials of the domain.

I hovered above open plan with the new lenses long enough to see that right now, cyberspace is a dark, empty place with a sterile little room hovering in it. Very cold.

We need context. We need softness and wiggleness. We need whimsy.

For example, a golden "floor" that fades into 360 degree horizon of rosy cumulus clouds. A teal sky above the clouds fades into black, where an imaginative galaxy hovers (illustrates the DEPTH of the place). A heavenly context in which to exercise godlike powers...

Yes, I'm thinking people, you're thinking polygons...so what's a reasonable polygon budget to make a room a home?

### **Capabilities (William)**

> Yes, one can do anything imaginable in there; the idea is to do something  
> specific, and computationally cheap. But what's cheap going for these days?

More than we are capable of displaying in real time right now. Our distinct problem is that it is extremely easy to raise the expectations of people by talking about golden floors and teal skies with clouds that are unrealizable for the better part of a year. Whimsy and wiggleness are computationally expensive, and if we tell people that's what it's going to be like soon and don't deliver, we won't be able to go any further.

### **"Make cyberspace a place to read poetry in" (William)**

I spoke to a CAD guru about cyberspace. He focused on one quality that was of paramount importance (to him). He called it anthroposynchronicity:

making the feel of cyberspace totally consistent with human expectations.

His suggestions include:

- soft cushions to make cyberspace warm and comfortable
- rhythmic auditory input (mantra like new music)
- aesthetic engineering

Soft cushions include:

- AI techniques to configure the space to expectations
- ways to eliminate jarring and shuttling (technical Gestalt concepts)
- pastel colors
- buffered movement
- fade-in and out during teleportation

He suggested the following literature:

- NeuroLinguistic Programming (NLP) - there are many books
- Physiology of Aesthetics (Austin)

Incidentally, he's pushing these same characteristics for CAD in general.

### **Continuing to Learn (world designers)**

We've learned a lot since planning our cyberspace demo, from researchers who have been in this field for many years. And as Fred Brooks puts in italics,

"Over-generalized findings from other designer's experiences are more apt to be right than the designer's uninformed intuition. Any data are better than none."

Data from several sources indicates quite clearly that three aspects of our proposed Open Plan Flythrough are counterproductive to our goal of a compelling demonstration of this new domain.

1- Navigation: Brooks and McGreevy both stress the observation that forming accurate mental models of virtual worlds, and thereby being to navigate through them, requires hours of exposure to these worlds. In a 5-minute demo, unconstrained (6 degrees of freedom) movement is disorienting and frequently very uncomfortable for the novice user.

Suggestion: Not too many people know how to fly; most people know how to roll around their office in their desk chair, and consider it kind of fun. We could do a "roll-through", where the user's perspective hovers a foot or so above the desk chair (vehicle). Using the track-ball, they could swivel around, or roll through the space in any direction. By constraining two

degrees of freedom and using a familiar metaphor, we could provide a more enjoyable experience.

2- Manipulation: Its not cyberspace if you can't manipulate objects, and a misrepresentation of the domain upon its introduction is obviously to be avoided. Manipulation of an external object (rather than one's perspective) can be done in the full 6 degrees of freedom range without disorientation.

Any direct manipulation of any object will suffice. If it is possible to sequence a set of related tasks (eg., pick up the ball, toss the ball up and catch it, bounce the ball off a wall and catch it), excellent data can be collected to support the hypothesis that this is an intuitively obvious domain in which to function...but more on the research possibilities inherent in all this in another rave.

3- Context: Providing a context for exploration that meets the basic *human* needs of the user is the subject of reams of research, and Open Plan in the Void violates most of it. Complexity (processing power) is not necessary to create a display that evokes a positive emotional response.

On page 57 of the Feb. Cadence is a simple but inviting context: A beach umbrella (implying sun, *warmth*) sits over a familiar director's chair; a *whimsical* plant is nearby, and at the foot of the chair are interactive tools that imply immediately that there are things you can DO in this place. By making a FEW additions to Open Plan, we can change its *cold* feel entirely. Representing interactive tools/objects, and providing some eye-pleasing context for our little room would make a more comfort-conducive environment. Comfort is not a luxury in a computer display -- it is a basic need.

### **On Cyberspace design modification (management)**

One thing I don't quite get: in point 1, you mention that Brooks and McGreevy observe "that forming accurate mental models of virtual worlds... requires hours of exposure to [them]." That would say that putting on the helmet for a few minutes - like we and hundreds of others have - would result in a disorienting and uncomfortable experience for most users. Were that true, why does everyone LIKE it? Note that using a COMPUTER for the first time (regardless of interface) is often a disorienting and uncomfortable experience. Granted, this is part of the problem that we are trying to solve (and I became awfully disoriented in Cyberspace at NASA), but we don't want to give people the impression that this is some special "acquired taste" like sushi or opera. Our audience will suddenly become very limited.

While it's true that not too many people know how to fly, an awful lot of them spend money on Microsoft Flight Simulator, and I think it would be bad to have a Cyberspace that wasn't even as much fun as that. Anyway, your point is well taken, and it's easy to allow just translation anyway (in fact,

it's a button on the Orb-o-matic "trackball").

With respect to context, I agree that Open Plan isn't the world's homiest place to be. So make one!!

### **Cyberspace design modification (William)**

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> hundreds of others have - would result in a disorienting and uncomfortable  
> experience for most users. Were that true, why does everyone LIKE it?

Its not just being In There that needs to be considered, but what you DO when you're There. McGreevy made a distinction between walking around and flying, saying that Fisher's way of introducing people to the experience by flying around caused far more discomfort than a walking-around demo.

Of course, we'll be able to ask Brooks about the exposure issue, and I did talk with him on the phone about that. Basically, he says that judgment (of angles, distances, etc) takes experience to develop. Cyberspace can be fun the first time, but it takes accommodation to do useful tasks. Brooks is focusing on accurate mental models, and the point is that we cannot rely on an accurate model from any new user. In my book, this eliminates things like catching balls.

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> them spend money on Microsoft Flight Simulator, and I think it would be bad  
> to have a Cyberspace that wasn't even as much fun as that.

There's this vast difference between watching a display and being inside, right? This is why what's fun to do on the screen with the flight simulator is weird and overwhelming when you're surrounded by it. Guess its easy to underestimate the POWER of the cyberspace experience, but "fun" seems to have a new set of parameters there.

I like the glide-through, mainly because it requires minimal modeling, and no new conceptualization. I recommend suppressing movement in z (up/down) and roll (lean left/right).

There's a difference between acquired taste and adaptive lag. The issue is that we must design a demo that does not require learning but does provide interest. You would be amazed at how many (average) people get totally confused doing a task for the first time. For example, it takes most teenagers many hours to learn to convert  $6x = 3$  to  $x = 1/2$ , and many never learn the general transformation.

Re design -- "just do it" is a naive approach if we have guidelines that we

know arise from long experience with this domain. I am not suggesting that we make our demo more complex or more difficult to achieve, but that within what we can do, we do it carefully. I am suggesting constraints that have been emphasized over and over by people who should know. It is as simple to present a pleasant image as it is to present a stark one. It is important to realize how powerful the cyberspace experience is and provide a comfortable introduction to the realm rather than a disorienting one.

I'm not suggesting MORE, I'm advising DIFFERENT. I've tried to outline the simple nature of these differences in terms of the research we've been exposed to ... and really don't see why what I'm saying isn't obvious. Management did understand my point about unconstrained flight ("no matter how bad your flying is on a Microsoft Flight Simulator, it won't cause the Technicolor Yawn.") The cognitive impact of cyberspace should not be underestimated, and I think "just do it" is not the responsible approach to this design effort. But I'm happy to continue to discuss my reasoning, the many options that exist, and the various approaches we could take.

### **Notes from the World Designers**

I think that the layout of the actual streets and buildings (a minimal set) in CyberCity do not have to be identified with any particular city, however we are thinking that the silhouettes that border the four sides of the city could have recognizable structural landmarks (i.e. the Transamerica building, Eiffel Tower, etc.) and could be changeable like props in a play (each scene being on a different layer). This way we do not have to design complex structures (built from extruded solid or polygons) in CyberCity itself. This model could also be used for the four horizons of CyberCounty (i.e. mountains, mesas, rolling hills, or whatever).

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Regarding our conversation this afternoon, you indicated that there are two parameters being optimized:

- o Familiarity/friendliness of the Cyberspace environment
- o Reducing the amount of geometry due to REGEN considerations

Since you feel that it is important that complete immersion in cyberspace is important, how about this: letting the cyberspace control cyberspace translucency with a dial, and using either a natural or a video generated (cartoon) environment alternative/background for cyberspace. The transition would not be as abrupt as a "Venetian blind" approach but rather a gradual one. Isn't that how Thoughtspace/imagination works?

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Such a good thought, gradually dialing between cyberspace and the "real" world...but the technology isn't there yet, not even for the "Venetian blind" approach. The transparent version of the 3-D headmounted display uses a completely different principle (the half-silvered mirror) than what we're doing; if you're interested, I have a paper or two on this technique I can loan you...

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I saw an exhibit at the Exploratorium in San Francisco many years ago. The exhibit consisted of a table with two chairs opposite each other and what appeared to be an upright mirror in the middle of the table. Two people would sit facing each other looking at themselves in the "mirror". There was a knob on top of the frame of the mirror that would control the transparency of the mirror and the faces of the two participants would blend together to a greater or lesser extent depending on the ratio of reflection to transparency. How it worked, I don't know, but it was pretty strange seeing your face blend into someone else's.

By the way, I brought the MGM stuff to work today -- the prototype headset for the "Brainstorms" movie along with some enlarged B&W photographs and a plot of my CAD wireframe model.

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Well, I guess it was inevitable: CAD tools finally grabbed me. I started looking into a smooth way to bring CAD drawings into cyberspace, and one thing led to another ... The upshot is that I've spent two full days completely absorbed in CAD, and I feel as if I'm on the tip of an iceberg. It really is an amazing capability. I can see why designers go wild over it. If I'd had it when I was working my way through college as a draftsman I'd probably be an architect now, or a mechanical engineer.

I hadn't planned on spending so much time learning CAD, but now I'm glad I have. For one thing, it's clearer now that we have a great deal to add. CAD is fantastic as far as it goes, but together with cyberspace it's going to be awesome. It's true that 3d modeling can be cumbersome, but that's not really a knock. Rather, it is just based on an old, basically 2d metaphor. What we can add - as you emphasize - is a natural, human style of interaction. We can also add new modeling capabilities, but at a level that isn't presently treated by CAD tools. Seems to me that CAD is wonderful for creating detailed static models, but provides no way to compose models in dynamic worlds. I mean, I guess I knew that, but I wasn't sure how CAD could accommodate the new capabilities. Now I don't think we should worry about it. We could use CAD tools to the hilt, just as it is, to build static models for inclusion in cyberspaces.

Presently I'm running CAD on the Mac II, while of course cyberspace runs on the PC. I have a serial connection between them, and bring models across in a two-step process that requires me to get out of cyberspace. It wouldn't be terribly hard, however, to set things up such that I could interact directly with CAD from cyberspace, via Ethernet. Using spoken keyword macros, I could actually TALK to CAD from cyberspace. Imagine saying something like "Give me chair", and having a model of a chair materialize in your virtual hand! You then place it wherever you want in your virtual world. William, we aren't far from capabilities like this. Next week, when we set up CyberCity, should be very interesting.