A Short While in The Life of The Universe

A document to help us visualize the player interaction in MicroCosm™
by
Chip Morningstar

Lucasfilm Ltd. Games Division
October 17, 1985

Introduction

This document is an attempt to describe a slice of life in the **MicroCosm™** universe, so that we might have a better visualization of what the system will be like from the player's point of view. This document will, in all probability, be updated from time to time, as our conception of the universe changes. I have no doubt that such changes will occur, because of maturation of the design and the pressures of implementation.

The material below which is in normal typeface is a description of what you see and do as you control your avatar in a journey out into the world. The paragraphs in*italics* describe what is going on behind the scenes and give other details about the way things work or about alternate things that might have happened. Paragraphs in **boldface** represent you the player speaking or thinking.

A Short While in The Life of The Universe

ÞWell, I guess it's about time to go check out the back forty, and see what the neighbors are up to lately.

You turn on your Commodore 64, slap your trusty **MicroCosm Personality Disk** into the disk drive, plug the phone into the modem, and boot up the half of the **MicroCosm** system that lives in your home. The disk twitches and the modem beeps and squeals (actually, we hope it doesn't, but you never know about these modems). After a few minutes, a message appears on the screen, in large, reassuring letters: ''Welcome to the MicroCosm''.

> *After loading itself from disk, the* **MicroCosm Home System** *reads a few important facts that it has stashed away: your system identity, the phone number of the local network port, and the last known configuration of your turf in the* **MicroCosm** *universe. It dials up the network and threads its way through the nation's telecommunications systems to the* **MicroCosm** *host. There it logs in as you, interchanging a few brief messages with the host that establish your identity in the system. Once this is done it is ready for action, and lets you know by displaying the welcome mat.*

The welcome screen is quickly replaced by a view of your avatar, standing around waiting in the middle of your turf. You see a small humanoid figure two or three inches high. He (for it appears to be male) is wearing brown pants, a green t-shirt, and what looks like a matching green golfer's cap. He stands facing you, with his hands on his hips, and appears to be grinning innocently. The expression on his face says, ''Hey, this is gonna be FUN!'' Yup, that's you all right. The part of your turf that he is standing in looks like the living room of a typical American home. You see a couch, a couple of chairs, and a lamp. There is also a door in the far wall, which you know from experience is the front door of your avatar's house. You grab the joy stick and you're ready to go.

> *The computer noted that you left your avatar standing in the living room the last time you interacted with the* **MicroCosm**, *so it looked in its local database to see how your living room was laid out. It*

drew the walls and door, and then the pieces of furniture. The images for the door and the furniture came from the standard library of household objects that comes with every **MicroCosm** *disk. It also remembered what your avatar was wearing as well as what its basic body looks like. (You can customize the appearance of clothing and so forth at will, but altering the body shape requires a special visit to the "body shop".) ÞOK, Phread, let's go check the mail.*

Some people think of their avatars as separate personalities. Others think of them as extensions of themselves. You prefer the former mode and refer to your avatar as "Phread".

You point to the door with the cursor and press the button. A little menu of actions appears and you select the entry labeled "**do**". The avatar figure turns around, walks to the door, reaches out, opens the door, and steps through the doorway. The scene immediately cuts to a view of the outside of your house: You see a simple, suburban house, with a sidewalk going up to the front door and a mailbox at the foot of the sidewalk. Your avatar is standing in the doorway.

Associated with each region of the universe is a standard viewpoint. The location of this viewpoint is established by the owner of the region. Most of the time this will automatically be done for him by the **MicroCosm** *software. In the situation described here, the viewpoint for the living room looks down at the furniture and the inside front wall of the house. The viewpoint for the outside front of the house looks back at the house from the street. When the avatar crosses the threshold from one region to another, the viewpoint used to render the display changes automatically from the standard viewpoint of the first region to that of the second. This is what happened when the avatar stepped through the doorway.*

You notice that the little red flag on the mailbox is up, indicating that there is mail waiting for you, so you point at the mailbox and select "**get**". The avatar walks down the sidewalk to the mailbox (and the door closes behind him). He stops at the mailbox, reaches towards it, opens it, and extracts what appears to be some letters. Now that the mailbox has been emptied, the red flag on it is lowered.

Control over the avatar is expressed in terms of a small set of general actions constrained by a locus of attention that provides a context for giving the general actions specific local meanings. This locus of attention is indicated by pointing the cursor at the desired object or place. An action is then selected from a menu of choices and the appropriate interpretation of that action relative to the center of attention is taken. In the above narratives, this happened twice.

*In the first action taken above, the selected target was the door. The action selected was "***do***". The* **do** *action applied to a door is interpreted as a request to open or close the door (i.e., open it if it's closed and vice-versa). The* **do** *action in g eneral, when applied to an object that is not immediately at the avatar's hand, also implies motion towards the object in order to be able to execute the action. Thus a motion component is overlaid onto this* **do** *action, which in turn implies that a motion through (not just to) the doorway is desired. If simple motion to the doorway was desired, a "***go***" action would have been selected instead. This would have carried the avatar to the door to await further instructions. At that point a* **do** *action dir ected at the door would open the door and leave the avatar standing next to the open door. A further* **go** *action dir ected at the door would carry the avatar through the doorway itself (also, a* **go** *action directed against a closed door carries with it the imperative to open the door before passing through).*

The second action taken above is directly analogous to the first. The action this time is **get***. The* **get** *action associated with a mailbox involves opening the mailbox and removing its contents, which is exactly what happened here.*

You want to read the letters so you point at the stuff in the avatar's hand and again select **do**. The view is replaced by a shot of a pair of stylized hands holding two envelopes: you have two letters.

What happened was that as the avatar was stepping through the doorway, the home system was building the display for the view from the outside of the house. Its internal model of the area outside the house included the fact that there was a mailbox there, so it queried the host for the state of the mailbox: does it have mail or not? The host responded that it had two letters, so the home system knew to display the mailbox with the red flag up. As the avatar was walking down the sidewalk to the mailbox the home system again queried the host, this time requesting the contents of the letters themselves. The host responded with some text which the home system tucked away for safe keeping until

you ask to see it.

You point at the top letter and again select the ubiquitous **do** (just about everything is done with **do**). The screen is filled with text:

```
      For your convenience
 the world will be unavailable
             from
           midnight
              to
           3:00 AM
         next Tuesday

               — God
```

This is obviously just a notice from the host system operations people warning you about impending downtime. A**put** action tak es you back to the view of the hands holding the mail. You point at the second letter and **do**:

Phread,
Come to the Fnork Fountain as soon as you can.
Bugsy

ÞAha! Something's afoot.

''Bugsy'' is another inhabitant of the universe with whom you occasionally have adventures. The ''Fnork Fountain'' is a nearby place where avatars gather to meet, do business, and embark on quests into the world. Fortunately for you it is not too far away; just down the road a spell, as a matter of fact. Another**put** gets you back to the view of the hands holding the letters. Yet another **put** (without selecting one of the two letters) gets you back to the view of your avatar standing in front of his house. You stuff the letters in his pockets (point at the pockets, **put**) and head on down the road to the right (point at road to right, then choose **go**.

Here we simply displayed the text of the letters on the screen. The letters carried with them some minimal formatting information, so that, for example, the letter from God was laid out one way while the message from Bugsy was laid out another. The mail system is set up inside the host so that players can send short messages to each other and so, as in this case, the system administrators can broadcast important news to the player community. To send a letter, of course, you go to the Post Office.

In our example, Phread put the letters in his pocket. As far as the host is concerned, these letters have been delivered and it no longer cares about them. You can retrieve the letters from Phread's pocket at any time simply by **get***ting on the pockets. Alternatively, you could have made him go back into the house and leave them somewhere inside. To retrieve them again, he would have to return to the house. Yet a third alternative would be to go back in the house and throw the letters in the trash, whereupon they would disappear forever. None of these actions, however, would require any transaction with the host. They are strictly local. Note that this does mean that the local computer could "cheat" and let you, say, take the letters out of Phread's pocket after he'd left them in the house, but this would not be an important transaction that affects the state of the world in any substantive way. One could just as easily argue that in such a case the avatar was just recalling the letters from memory — which is, of course, exactly what the home computer is doing.*

Heading down the road entails a major context shift on the part of the home system, because, for the first time, the avatar is stepping off of his own turf. The state of the turf is almost entirely internal to the home computer, and so movement and actions within it require few transactions with the host. Stepping outside requires information that the home machine will not have unless it asks.

As you head down the road, the view shifts again, this time showing the view down the road in the direction you are walking (or rather, in the direction Phread is walking). You point at the horizon above the road and choose **go**. This indicates that you wish to walk down the road indefinitely far, continuing until you run into something or explicitly indicate that you wish to stop. The viewpoint follows the avatar as he walks. From time to time he passes things by the side of the road: other avatars' houses, fences, telephone poles, etc. At one point he passes another avatar walking in the opposite direction. You see another humanoid figure of roughly the same model as Phread, but proportioned and dressed somewhat differently. Since you are each bent on business elsewhere, neither of you chooses to speak to the other, but the other avatar gives a friendly wave as he goes by. After a short while the Fnork Fountain comes into view and you select the "**stop**" action, which causes Phread to cease walking. You stop and look around.

Once off his own turf, an avatar's movement is regulated by exchanges with the host. The host imposes a limitation on how much travel may occur in a given interval of time. When walking along, the home system essentially sends a continuous stream of "walk to location xx" messages to the host. Each such message updates the avatar's position in the world. The host enforces the restriction that the distance between the avatar's old position and its new one is no more than a certain amount. This limit is referred to as "walking speed". (Actually, an avatar may exceed walking speed by a factor of two or three for a short time. This, not surprisingly, we call "running". Running is not allowed without a penalty, however. The penalty is a greatly reduced walking speed for a moderate amount of time thereafter — the avatar is tired and has to take a breather.) The host responds to each movement request with a confirmation or a denial. Denial can come for two basic reasons: the travel distance was too large, or some obstruction blocked the way. The denial message that the host sends back will tell which of these things it was.

As the avatar moves across the landscape, the home system also queries the host about things that have come into view. The query messages ask, "what can I see in region thus-and-so". The responses take the form, "there's an object of type xx at location yy", or, "there's nothing there". The home system must then display the appropriate images on the screen in the appropriate locations. Some objects, such as telephone poles or the road surface itself, have unvarying standard representations that the home system can call up out of its internal database of imagery. Other objects are somewhat more complicated and require a query to the host to obtain more information. Consider, for example, a house. A house has a basic form that the home system knows. It builds the picture of a house out of a set of pre-defined building blocks, but it must ask the host for the configuration of these standardized components: How big is it? Where are the doors and windows located? and What color is it? Of course, if the house was not going to be a significant element in the actions of the avatar (i.e., you're just passing by and you don't really care what it looks like) the home system could simply display a generic house image and save the communications bandwidth with the host for something more important (remember: 300 baud).

Some even more unusual or complicated features, such as the Fountain, may have to be described by getting the images themselves from the host. However, such objects are guaranteed not to change their appearance, and so your home system can obtain the image and save it forever on disk for future reference.

Note that the home system must explicitly query the host for information about what is seen, rather than having this information provided automatically as a result of movement. This is because the home system has the option of locally caching the information about what has been encountered. Thus, if in the above example you wished to have Phread just walk back to his house, your home machine needn't ask the host about any of the objects encountered along the way. It can simply remember them from the trip out. Of course, there is always the chance that something might have appeared, disappeared, moved or changed, but the probability of this happening is usually fairly low. Possibly we will provide an option on the "tell me what is here" query that adds a time-stamp, so that you can effectively ask, "what is here that has changed since time such-and-such". Since usually the answer will be that nothing has changed, communications bandwidth requirements will be reduced.

The encounter with the other avatar on the road is a special case, however. If another avatar moves into range of yours, your home system is notified by the host without your having to ask. When the

avatar appears initially, a message arrives giving the parameters that describe its appearance and its location. (I am still undecided on the issue of identity: should avatars have unique identities that other players can perceive, i.e., can you pretend to be somebody else or will they always know that it's you?). Any time the avatar moves or takes any action that is perceptible to you, you are notified. When the avatar disappears from view, you are notified. This means that encounters with other players are bandwidth-intensive. Some means of restricting the density of avatars in a particular area will be needed to avoid overload.

In the view in front of your, you see the Fnork Fountain itself (a baroque structure indeed) and three or four other avatars standing around. One of these you recognize as your friend Bugsy. You walk up to him (point at him, select **go**) and begin a conversation. To talk to another avatar, you point at him and type whatever you wish to say on the keyboard. Things that he says to you appear in a line of text at the bottom of the screen, like the chase-lights displaying the news at Times Square.

Multiple people can potentially be speaking to you at the same time. The one who starts talking first gets through first. The avatar who is speaking is highlighted on the screen above, so that you can tell who is talking. Of course, at 300 baud, a multi-person conversation can be confusing if people all try to talk at once. Folks will just have to learn manners. You can speak to multiple people — to anyone in "hearing range" actually — by pointing at the sky or the ground and then typing.

So you say (or rather, type) to Bugsy,

What's up, Bugface?

```
Word is something big is about to happen.
```

What?

```
Something wonderful...
```

and so the conversation goes and it turns out to not be so wonderful really. You eventually establish that there's this gang of slimy avatars are scheming to ''take over'' the region of the world you inhabit, and are planning on extorting tribute from all the inhabitants before allowing them to move around safely. In other words, if you step off your turf and you haven't paid up, a bunch of nasties will come and beat you up, or worse. ÞOh sh*t!

The two of you decide that you should visit the Wise One, a certain avatar who is reputed to give good advice in such matters. Fortunately, you know whereabouts the Wise One is to be found. Unfortunately, it is quite far away. Fortunately, Bugsy has a car. The two of you walk to Bugsy's house (a journey similar to the one you made to get here). Bugsy's house is like yours, but not identical. And in front is parked Bugsy's car.

Bugsy gives you the car keys. Handing something to someone is simple. You get the item into your hand, point at the person you wish to give it to, and select **put**. This is what the player controlling Bugsy does with the car keys. Receiving an item is equally simple: it appears in your hands.

When you give an item to someone else, your home computer sends a message to the host that says, basically, "give item number such-and-such to person xx". If the person is close enough and is not already holding something else, it works. Your home machine then makes note of the fact that it no longer possesses the item, and displays the item in the hands of the receiver instead of in your hands. Receiving an item is just as easy. Your home system gets a message from the host that says "you were just given item number such-and-such". It can acknowledge the receipt, in which case it places the item in your hands, or refuse it, in which case the giver's attempt to pass the item to you fails.

You get in the car by pointing at it and selecting **go**. Having the car keys in your hands confers on you the right to open the car doors. Once you are in the car the keys confer on you the right to drive it. Driving a car is just like walking, except that you go faster. Also, the images displayed are those of you in the car rather than of you walking. The car will not run into things (or run people over) unless you explicitly command it to. This may wreck the car or the thing hit or both. Of course, wrecking the car while you are

driving it also entails a significant risk of injuring yourself as well.

> *The car keys act as a limited token of authority over someone else's property. Ordinarily, you can only manipulate objects that you yourself own or that are owned by nobody. However, when Bugsy gives you the car keys he doesn't give you the car itself. The keys give you the right to operate the car, but Bugsy retains property rights to the vehicle. This may be useful for supporting economic behavior within the system. How this will work is unclear, however.*
>
> *Vehicles are a special class of objects. They confer on the avatars operating them an increased traveling speed. They also confer an increased carrying capacity. Vehicles are also containers: things can be put inside them and then these things move without volition of their own. This is particularly important in the case of avatars who are passengers (as opposed to the driver) in a vehicle. They are carried along wherever the vehicle goes and have no say in their location. Furthermore, it is impossible for an avatar to leave a vehicle that it is moving.*
>
> *Display management during travel by vehicle is a special problem. The problem arises because the number of objects that can come into view in a given amount of time is greater, since the speed of motion is greater. There are a couple of ways of dealing with this. One is to consider that an avatar inside a vehicle simply cannot see as far. The idea is that things are going by so rapidly that you only notice things that are nearby. The other way to cope with this is to deliberately choose to ignore certain fields of view. For example, only request information from the host about objects that are in the road ahead or which are major navigational landmarks (such as road signs). Only when you reach your destination do you request a complete description of the environment you have arrived in.*
>
> *Collisions are another complication. They require that the host perform a probabilistic computation to determine the nature and extent of the damages, and then to inflict the damages it must alter various properties of the things damaged and send out messages informing the owners of what has happened.*

So, you get in the car and drive off to look for the Wise One. We won't go into too much detail about the journey, because, as we said, it's just like walking only faster. Suffice to say that you are bright enough to not run into anything along the way, and in due time you arrive at the house of the Wise One.

You open the door of the car (point at car, **do**), get out (point at outside of car, **go**), and walk up the walkway to the front door of the Wise One's house. This house is like yours only bigger and fancier. You knock on the front door. Knocking on a door is just like trying to open it: you point at it and select **do**. The difference is that the door is not yours, and so you can't open it (unless you have a key). Knocking is what's left — you're still trying to open it, but now you're stuck with hoping that someone else will come and open it for you. In this case, after a few moments, the door opens and an avatar appears.

> *When someone attempts to enter your turf, the host system tries to contact you. If you are not on the system, or if you* are *on the system but your avatar is not on your turf, then the area occupied by your turf is impassable to others. The imagery displayed of it is that of whatever set of objects represented it the last time you* were *around. If, however, you are on the system* and *at home, the host sends a message to your machine informing you of the intrusion. Your computer alerts you with the sound of someone knocking at your door. You are then free to respond as you wish. If you do not go out and interact with the visitor, the visitor will perceive things just as if you were not home.*

You speak to the person who answered the door:

Is this the house of the Wise One?

```
Oh no, I'm terribly sorry.  That is the place next door.
```

The avatar points to the left. Though you don't understand how you could have gotten the address wrong, you thank him and walk to the left. Another, similarly large house comes into view. You walk up to the front door and knock. There is no answer...