

## Re: O'Neill habitat spin axis

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**From:** Joe Strout ([joe\\_at\\_strout.net](mailto:joe_at_strout.net))

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To: [sci-space-tech@moderators.isc.org](mailto:sci-space-tech@moderators.isc.org)

In article <412b8388.214868310@news.eircom.net>, [wallacethinmintr@eircom.net](mailto:wallacethinmintr@eircom.net) (Russell Wallace) wrote:

> *I'm designing an O'Neill habitat for use in a game scenario, where I'm  
> trying to keep the science as plausible as possible. It's going to be  
> the classic "spinning tin can" design, surrounded by an array of solar  
> panels, mirrors and radiators (and directly in orbit around a star,  
> rather than a planet, though I could change that if there was reason  
> to do so). My question is about the spin axis.*  
>  
> *I'd ideally like to point it at the sun. Then the nearside cap could  
> be coated in solar cells while the rest of the surface is painted  
> black to help radiate heat.*  
>  
> *But in that case, it seems that a quarter orbit later it'll be side on  
> to the sun, another quarter orbit the opposite end will point at the  
> sun etc, since conservation of angular momentum will tend to keep the  
> spin axis pointing in the same direction relative to the rest of the  
> universe, not relative to the sun.*

I'm not a physicist, but for what it's worth, I agree.

> *Is there any way to change that (I mean, reasonable ways, i.e. without  
> expending propellant or using huge gyroscopes etc)? For example,  
> Earth's axis precesses every 26,000 years IIRC; how does that square  
> with conservation of angular momentum? Is there a way a habitat's axis  
> could be made to "precess" through a full circle every year?*

I don't think so. However, have you considered using two habitats, joined by their endcaps (either side-to-side or end-to-end), and spinning in opposite directions? In that case the net angular momentum is zero, and you can set the system spinning however you want (e.g., sun-synchronously).

> *Or if not, is the best solution then to orient it vertically, let most  
> of the surface be mirror colored, and paint the end caps black?*

sci.space.tech: Re: O'Neill habitat spin axis

Well, a traditional O'Neill habitat would be piping sunlight into the habitat somehow for natural lighting, and have external radiators and solar panels (which don't spin). Heat rejection is always a major problem; I'm not sure why you would want to paint any part of it black (certainly not any part that's going to see sunlight).

Also, be sure to consider what you can do with giant mirrors — for example, if you have windows on the endcap, you can use a giant mirror at 45 degrees to reflect sunlight into them. You could also put your solar panels there I suppose, but I don't know why you would want to spin your solar panels — much easier to have those external, non-rotating (except to point at the sun), and powering the habitat via cable (or wireless power transmission).

Best,  
— Joe

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