

Re: Solar concentration mirrors in the outer solar system

Source: <http://sci.tech-archive.net/Archive/sci.space.policy/2004-07/0884.html>

From: Alex Terrell (alexterrell_at_yahoo.com)

Date: 07/09/04

Date: 9 Jul 2004 03:59:35 -0700

"Perplexed in Peoria" <jimmenegay@sbcglobal.net> wrote in message news:<A31Bc.25910\$eH1.12158781@newssvr28.news.prodigy.com>...

> >

> > *The edge of sunlight, commonly put at 3 A.U., could possibly be extended to hundreds of times that by using extremely thin mirrors to concentrate the attenuated solar light. The mirrors could be aluminum a few tens of atoms thick, and an array of flat mirrors could be aimed with a support structure to focus this for useful solar energy and/or light.*

> > [snip]

> > *distance area required mass required*

> > *(A.U.) (m²) (kg)*

> >

> > *orbit of Pluto 35 5.83 x 10⁹ 2.33 x 10⁶*

> >

> > *current outer*

> > *edge of the Kuiper belt 70 2.33 x 10¹⁰ 9.32 x 10⁶*

> >

> > *furthest orbit of Sedna,*

> > *inner edge of the Oort cloud 900 3.86 x 10¹² 1.54 x 10⁹*

> >

> > *These could be made from chunks of aluminum only 10, 16, and 83 meters*

> > *across respectively.*

>

> *It takes a lot of energy to find and refine that aluminum and to form it into mirrors. Such an installation will have to pay for its own cost of construction in less than 10 years to be worth doing. So, if you can estimate the energy cost of construction, you can construct a graph showing how time to pay back construction energy increases with distance from the sun. The point where that line rises past 10 years or so represents the real economic "edge of sunlight". It may be farther out than 3AU, but I'll bet it is well inside the Oort cloud.*

>

The economics of far out settlements are a completely different

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subject. Suffice to say for the moment, that:

- The masses are small compared to the settlement mass, upto the inner edge of the Oort cloud.
- Current nuclear reactors weigh about 25 tons per MW, or 25 E6 Kg per GW. Sure – this will improve, but they could still cost more than mirrors at 70 AU, especially as the radiators need to use fluids operating across ~5K to 800K temperature range.

I suspect (using foreseeable technology – which is not realistic) a large space settlement at 100 AU would use big mirrors for light, and nuclear power for electricity, with each able to back up the other.