

## Re: Colony ship to Alpha Centauri – The Motion Picture Concept by A. Ahad

**Source:** <http://sci.tech–archive.net/Archive/sci.electronics.equipment/2005–01/0134.html>

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**From:** Dirk Bruere at Neopax ([dirk\\_at\\_neopax.com](mailto:dirk_at_neopax.com))

**Date:** 01/06/05

Date: Thu, 06 Jan 2005 13:42:03 +0000

Kryten wrote:

> *"Rich Grise" <richgrise@example.net> wrote in message*  
> *news:pan.2005.01.06.06.30.13.992685@example.net...*  
>  
>> *On Wed, 05 Jan 2005 19:22:07 +0000, Dirk Bruere at Neopax wrote:*  
>>  
>>  
>>> *Rich Grise wrote:*  
>  
>  
>>>> *expel my breath as hard as I could, so my lungs don't explode. Of*  
>>>> *course,*  
>>>> *you'd have to keep your eyes shut real tight. :-)*  
>>>  
>>> *IIRC you get around 15sec of consciousness in vacuum. Which is quite a*  
>>> *long time*  
>>> *if all you have to do is open a door.*  
>>  
>> *And close it behind you, and turn the "AIR NOW!" valve, and so on. :-)*  
>>  
>> *I wonder what it would feel like on your eyes, if you, like, peeked?*  
>  
>  
>  
> *Dunno, but I'm pretty sure your eyes are under no pressure to pop out of*  
> *your head on stalks (as shown on Total Recall) or your head pop like a messy*  
> *balloon (as in Outland). Unless of course your head is full of compressed*  
> *air.*  
>  
> *It is true that blood contains dissolved gases, but a decrease of 1*  
> *atmosphere is only about the same as ascending 407 inches (10.3 metres) in*  
> *water. I don't think you get the bends unless you have been down a fair bit*  
> *deeper or longer.*

[http://imagine.gsfc.nasa.gov/docs/ask\\_astro/answers/970603.html](http://imagine.gsfc.nasa.gov/docs/ask_astro/answers/970603.html)

From the now extinct page <http://medlib/jsc.nasa.gov/intro/vacuum.html>:

How long can a human live unprotected in space?

If you don't try to hold your breath, exposure to space for half a minute or so is unlikely to produce permanent injury. Holding your breath is likely to damage your lungs, something scuba divers have to watch out for when ascending, and you'll have eardrum trouble if your Eustachian tubes are badly plugged up, but theory predicts -- and animal experiments confirm -- that otherwise, exposure to vacuum causes no immediate injury. You do not explode. Your blood does not boil. You do not freeze. You do not instantly lose consciousness.

Various minor problems (sunburn, possibly "the bends", certainly some [mild, reversible, painless] swelling of skin and underlying tissue) start after ten seconds or so. At some point you lose consciousness from lack of oxygen. Injuries accumulate. After perhaps one or two minutes, you're dying. The limits are not really known.

You do not explode and your blood does not boil because of the containing effect of your skin and circulatory system. You do not instantly freeze because, although the space environment is typically very cold, heat does not transfer away from a body quickly. Loss of consciousness occurs only after the body has depleted the supply of oxygen in the blood. If your skin is exposed to direct sunlight without any protection from its intense ultraviolet radiation, you can get a very bad sunburn.

At NASA's Manned Spacecraft Center (now renamed Johnson Space Center) we had a test subject accidentally exposed to a near vacuum (less than 1 psi) in an incident involving a leaking space suit in a vacuum chamber back in '65. He remained conscious for about 14 seconds, which is about the time it takes for O<sub>2</sub> deprived blood to go from the lungs to the brain. The suit probably did not reach a hard vacuum, and we began repressurizing the chamber within 15 seconds. The subject regained consciousness at around 15,000 feet equivalent altitude. The subject later reported that he could feel and hear the air leaking out, and his last conscious memory was of the water on his tongue beginning to boil.

Aviation Week and Space Technology (02/13/95) printed a letter by Leonard Gordon which reported another vacuum-packed anecdote:

"The experiment of exposing an unpressurized hand to near vacuum for a significant time while the pilot went about his business occurred in real life on Aug. 16, 1960. Joe Kittinger, during his ascent to 102,800 ft (19.5 miles) in an open gondola, lost pressurization of his right hand. He decided to continue the mission, and the hand became painful and useless as you would expect. However, once back to lower altitudes following his record-breaking parachute jump, the hand returned to normal."

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Dirk

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