The Future of Centrifugal Spacecraft: Applications, Methods and Implications.

Outline:

Intro:

* Thesis:
  + Centrifugal structures in future spacecraft will usher in a new age of space exploration that focuses on human wellbeing in long journeys; promoting increased productivity and safer mission outcomes. As well as more effective missions, centrifugal structures open the idea of long-term, or even permanent, colonies in microgravity.

Para 1:

* Explanation of centrifugal structures.
  + Relationship between angular velocity and radius, maybe a sweet spot between the two?
  + What materials are best suited, and the longevity of these structures in space.

Para 2:

* Reasons against utilising this design
  + Massive cost
    - As angular velocity increases, stronger materials are needed
    - As radius increases, more support is needed as is more mass, which increases cost
      * However, as radius increases, there is more surface area for photovoltaic cells which enhances power output – minimising the need for nuclear cells and thus increasing safety and cost-effectiveness.
    - Costs could be minimised by extra-terrestrial mining,
      * Large asteroids, lunar expeditions or even building colonies on phobos and/or deimos and increasing angular velocity
  + In case of disaster
    - Since there is a constant acceleration outwards, if supports fail, the entire structure could fall apart – exposing inhabitants to exterior vacuum
    - Larger radii increase risk of being impacted by objects such as meteorites or space debris.

Para 3:

* Benefits of centrifugal structures over conventional spacecraft
  + Increased productivity of scientific missions (small scale centrifuges), since presence of gravity reduces the need for constant exercising (which helps maintain bone/muscle density but takes up hours each day).
  + Offers space colonisation to those who are not extremely physically fit.
  + Allows for easy and conventional farming due to artificial gravity.

Conc:

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