

# Making Space Livable

Technology vs Physical and Social Hazards

By Deuce of FurryMUCK =^.^=

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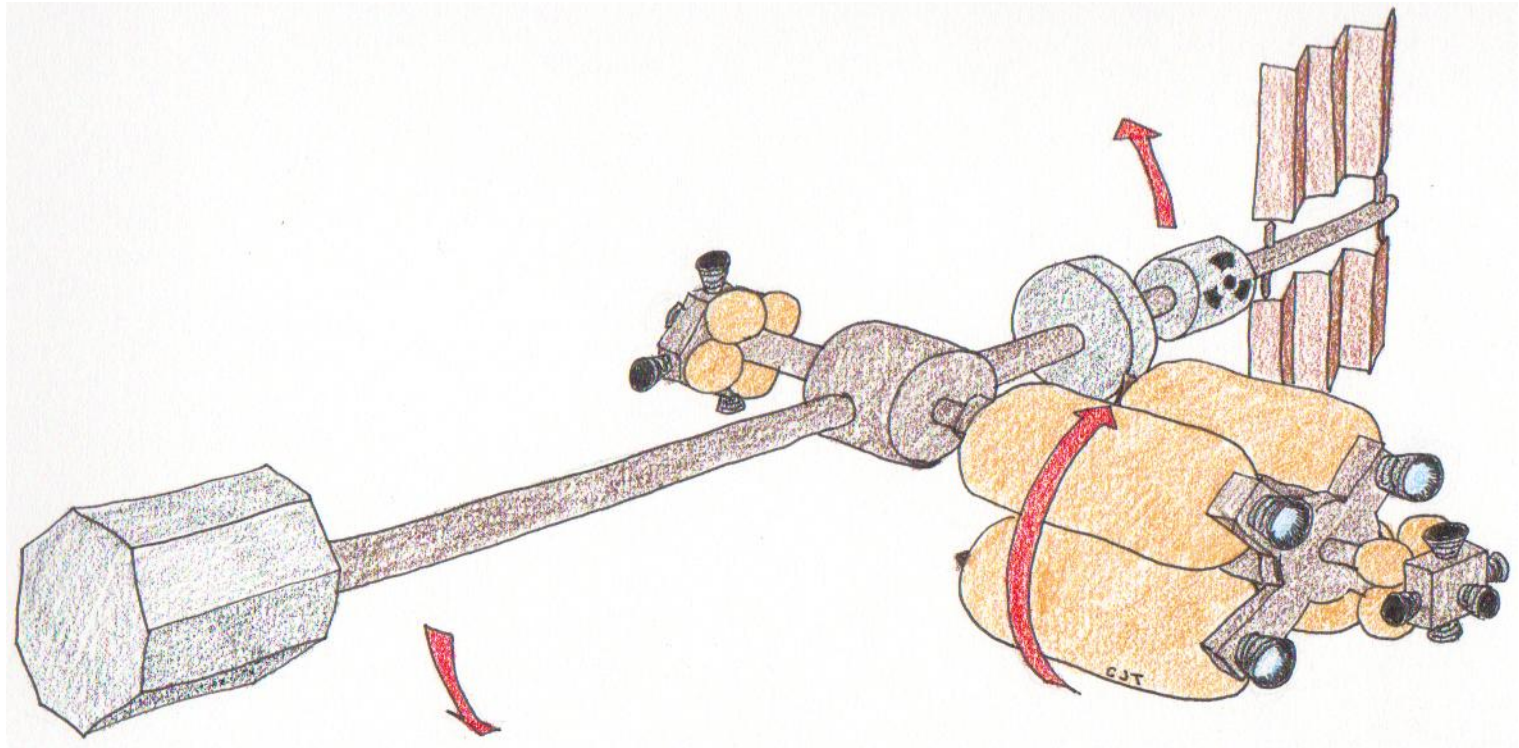
# Space Hazards

- Physical Hazards
  - Microgravity
  - Radiation
- Social Hazards
  - Confined space
  - Isolated
  - Limited expertise on board
  - Incompatible people, cultures, psyches, instincts

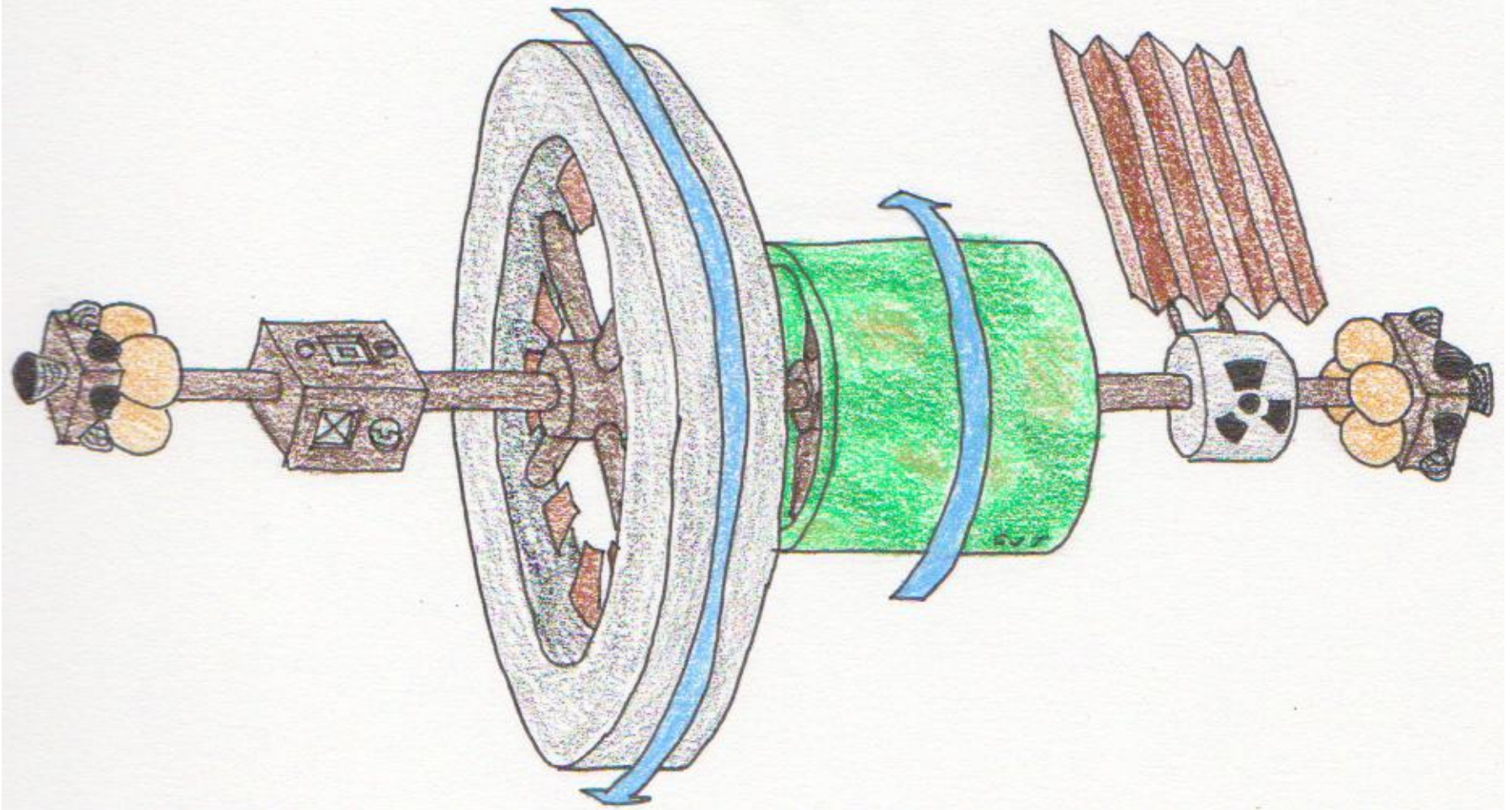
# Mitigating Physical Hazards

- Mostly through careful craft design.
- Spin crew sections for pseudogravity.
- Lots of dead weight for radiation shielding.
  - Structure, tankage, plating.
  - Means crew space is small!

# Sample Craft: Baton Ship



# Sample Habitat: Stanford Station



# Mitigating Social Hazards

- What can technology offer?
  - Storage space is very cheap/compact.
    - 1M books or 1000 movies per TB.
  - Processing power is cheap/compact.
    - Existing computers render huge virtual environments.
- Hardest task: Outside Communication
  - Very low bandwidth, very long latency.

# Providing Entertainment

- Much easier to carry than to download.
  - Crew's weight in HDDs can carry an entire culture's entertainment.
  - Ditto technical reference material.
- Any spacecraft will have an amazing entertainment centre, for crew sanity.
- Cultural seed concept: Carry enough to reconstruct a culture.

# Providing Expertise

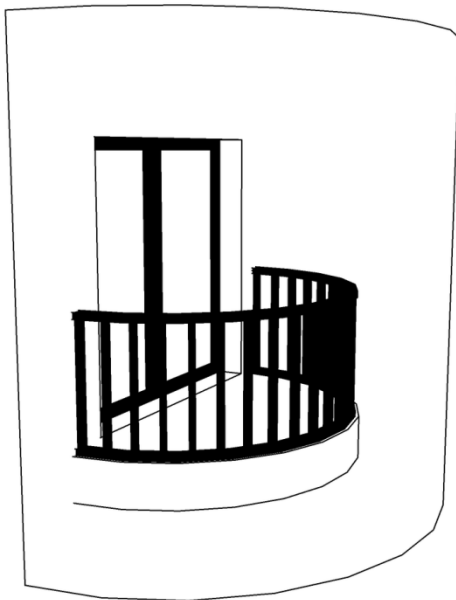
- Will at most have one general engineer and one general doctor on board.
  - Not enough!
  - Especially if multiple species.
  - Aliens are even worse: foreign biologies.
- Mitigation: Expert Systems
- Mitigation: Augmented Reality Overlays

# Providing Expertise

- Mitigation: Telepresence
  - Can't act in real-time far from station/planet.
  - Can check expert system diagnoses.
  - Can provide advice and guide actions.
- Near planets/stations, can act in real-time.
  - Ship needs fewer on-board experts close to home.
- Far future: AI doctors/specialists
  - Software or mind uploads

# Providing Elbow Room

- Crew space is small, due to shielding weight.
- Mitigation: Virtual displays.
  - Make the space seem larger.

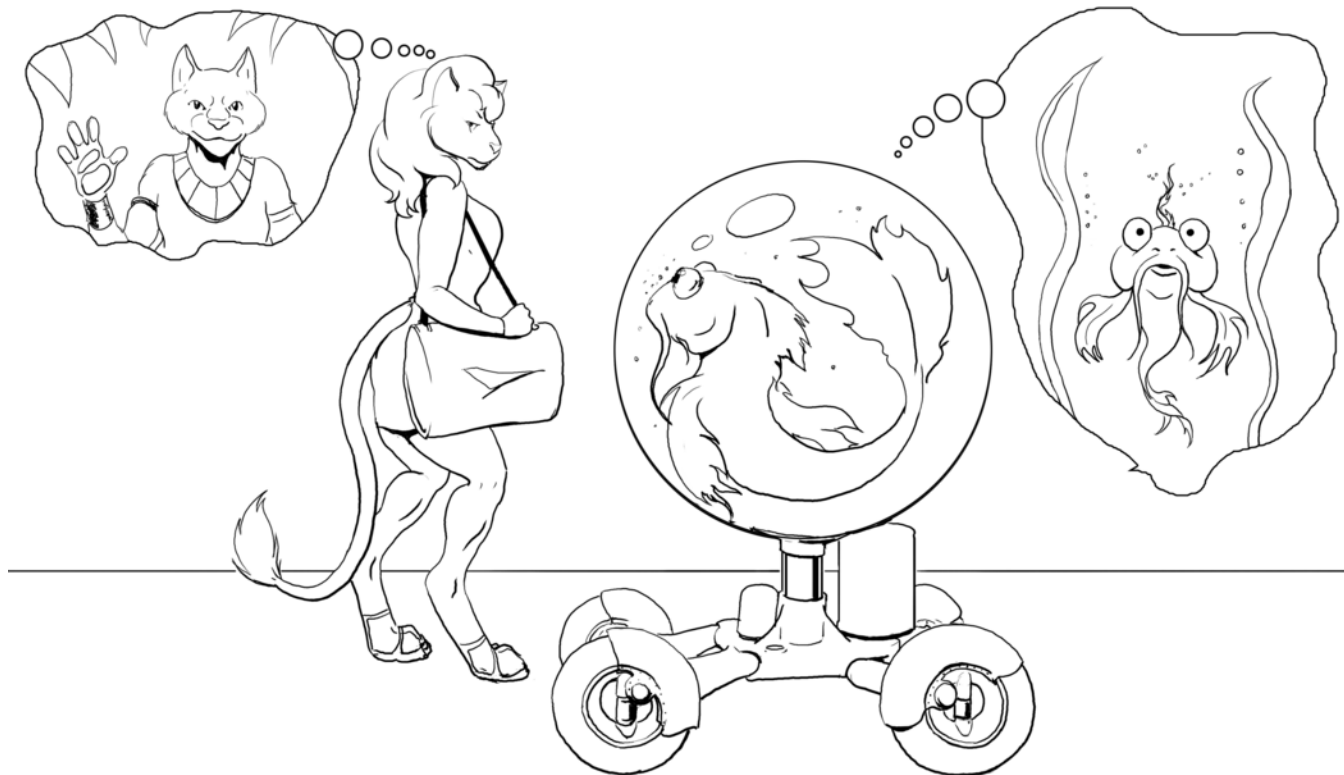


# Species Compatibility

- Different biochemistries: Completely isolated.
  - Visit using space suits or telepresence or VR.
- Same biochemistries: May still have issues.
  - Incompatible instincts (predator/prey, cats/dogs).
  - Incompatible cultures.
  - Incompatible environments (air/earth/water)

# Species Compatibility

- Mitigation: Augmented Reality
  - Give each the illusion of a compatible environment.



# Looking Forwards

- Space is a hostile and stressful environment.
- Can mitigate this, a lot, with modern computer technology.
- Can improve social environment on Earth, too.
  - Virtual environments where like minds can gather are already here.