NASA: Asteroid Contest

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In the event that an asteroid is expected to have a close approach to Earth, NASA could send a small team of 4 on a trip, which would last approximately 14 days. If astronauts were able to reach the small asteroid, they could come into close orbit around it and simply float from their spacecraft to the asteroid. From there, they could perform experiments on the asteroid, gaining knowledge and experience for potential future missions.
During the trip, air will be necessary for survival. The air needs to be composed of elements similar to that of Earth. A Major Constituent Analyzer (MCA), similar to devices in the International Space Station (ISS), will be able to monitor the Orion MPCV’s air along with alerting the crew if levels become unbalanced.
Of the gases that are needed to mimic Earth’s atmosphere, only oxygen is difficult to maintain. Although nitrogen is a large portion of the atmosphere, nothing needs to be done to maintain it: we breathe out as much as we breathe in. Carbon dioxide can be vented out by means of a Carbon Dioxide Removal Assembly (CDRA), similar to that on the ISS. Also, there will be a lithium hydroxide (LiOH) cartridge as a backup system.

Carbon dioxide molecule
The average amount of oxygen consumed by a person in a single day is approximately 550 liters, or 19 ft³. Therefore, a 2-week trip for 4 people would take about 30800 liters, or 1064 ft³, which is greater than the entire volume of Orion MPCV. However, the oxygen can be cooled to liquid form. Since liquid oxygen, or LOx, has an expansion ratio of 1:860, one could still carry twice the necessary amount (in case of emergency) and it would only take up 71.62 liters, or 2.47 ft³.
Exiting the Capsule

Once the Orion MPCV reaches the asteroid, the problem of exiting the capsule arrives. First, all the astronauts put on their spacesuits, which allow for a 7-hour oxygen supply. Since the Orion spacecraft has no airlock, the air must be moved to the Service Module of the Orion MPCV. This will keep the artificial atmosphere from being depleted of nitrogen and other inert elements that make up the atmosphere. This also reduces the payload that would be required to maintain additional nitrogen.
Exiting The Capsule (cont.)

It must be confirmed that the space suits worn by the astronauts can contain a synthesized environment, or else the astronauts will be forced to suffer extreme temperatures. Also, radiation must not pass through the space suit. This is because even short-term effects of radiation in space can become deadly.

An example of a space suit
Finally, the issue of gravity is important. Since the Orion MPCV is in close orbit around the asteroid, the astronauts will have to propel themselves to the asteroid by means of both self-propulsion and using a jet pack, similar to that of space shuttles and other satellites in space. Once this is accomplished, they will need to try not to overexert themselves. If they do, they may accidentally propel away from the asteroid, which has a mass much less than that of Earth. If they do, they will need to use the jet pack to return. As their oxygen supply is almost fully depleted, they will need to “jump” back to the Orion MPCV, replace the oxygen in their environment, and take off their suits.
Air and going outside the capsule are definitely related to one another. When going outside of the Orion MPCV, conserving air instead of venting it into space is necessary, since Orion has no airlock. If this is not done, only oxygen will be left after the first trip onto the asteroid after repressurization. An atmosphere consisting of 100% oxygen can be harmful to humans, both biochemically and environmentally (as a fire hazard).