Getting to Mars

Psychological needs/concerns

By: Elisabeth Ambrose

Taking a trip to Mars would be unlike anything ever experienced by humans before. As they travel away at thousands of kilometers per hour in a tiny capsule, the Earth would get smaller and smaller until it was just a tiny dot. The feeling of empty space all around would be almost crushing, leaving no doubt of the tiny insignificance of the speck of a spacecraft. And how would people handle living together, cramped in a tiny space with no escape for three years? Communication with Earth would take longer and longer, eventually causing there to be 20 minute delays between messages. If problems aboard the spacecraft emerged, there would be little or no help available from Earth. The threat of death would be woven into everything the astronauts did. A tiny hull breach by a small meteorite or a flare from the Sun would pose fatal hazards that the crew could not prepare for or fix. What would be the psychological effects of such a journey?

It is possible to get a glimpse of what life might be like on such a journey by looking at similar environments here on Earth. Environments such as that on board a submarine, the International Space Station, or a remote scientific camp in Antarctica mimic the psychological problems that might be present during a trip to Mars. Examples

of these psychological problems could include concerns about a limited amount of resources, the unchanging social group, social isolation, limited communication with the outside world, a self-contained ecosystem, the constant sense of danger, physical confinement, lack of privacy, lack of separation between work and non-work, limited opportunity for variety and change, limited sensory deprivation, and dependence on machine-dominated environment.

As a specific example, travelers to Antarctica are very cut off from the outside world, just as astronauts bound for Mars would be. Neither would be able to contact their loved ones whenever they wished, and both would be so far removed from the recognizable world that no trace of it would remain. Also, people in Antarctica must be very careful with their equipment, food, and supplies in order to stay alive in the bitterly cold, harsh conditions. Astronauts bound for Mars would share these types of concerns. However, people living in Antarctica would have plenty of air to breathe and plenty of water to drink. They would not have to bring these supplies with them or be concerned that they might run out. They would also have plenty of space – if one member of an Antarctica team got annoyed with another, he or she would have the whole continent to walk away and be separate for a while. Astronauts, however, would be very confined with no escape from each other, and they would be very worried about the supply of air and water.

On the International Space Station, astronauts deal with limited supplies of air, water, and food every day. They also live in very small quarters and must be able to cooperate

in order to survive. These conditions would be very similar to those experienced by astronauts bound for Mars. However, if astronauts aboard the ISS ever got homesick or frightened, they merely have radio down to Earth to speak with their families or friends, or to look out the window to see that Earth is just a short flight away. In the event of a major disaster that threatened the lives of those aboard, emergency escape vehicles are available to shuttle the men and women back to their home planets. However, aboard spacecraft bound for Mars, no such quick communication or emergency ride home would exist. As the ship got farther and farther away from the Earth, radio messages would take longer and longer to reach them. Also, the Earth itself would shrink to the size of a tiny dot, similar to the other stars. No one in human history has ever been so far from our home planet, and the psychological effects of seeing Earth nearly disappear into the darkness of space are much unknown.

Perhaps the best analogue relating to travel to Mars would be that of a person in a submarine. Living on a submarine for an extended period of time would certainly be similar to living in a spaceship going to Mars. In both situations, the people on board would be living in very cramped, tight quarters, and they would be forced to get along to survive. They would be breathing filtered air and drinking filtered water. All necessary food and personal supplies would have to be brought on board the ship before it departed. In addition, communication with the outside world would be limited and delayed, resulting in only sporadic contact with the crew's loved ones and friends at home. Perhaps most similar would be the dependence on machines for life and

safety and the imminent threat of death if those machines fail. Just as all aboard the submarine would be killed in the event of a hull breach, or a fire, so would all be killed in a spaceship bound for Mars. However, it is important to note that if a crew member became very ill or if an emergency happened that was not immediate, the submarine (unlike the spacecraft) could always return to the surface in a relatively short time to secure help.

In order to alleviate some of these potential problems that might arise during a mission to Mars, studies are being done to determine the types and numbers of people that would best handle the enormous stress and that best get along in these types of environments. Technology is also being developed to help determine when an astronaut is in psychological distress, and to develop strategies for dealing with the distress that do not involve returning to the Earth. For example, computers can now discern the emotional inflection in a person's voice to look for signs of emotional trouble. If the computer does find that someone is in need of help, it is programmed to suggest ways to alleviate the problem, such as recommending extra rest, extra food, or possibly medications.

The Benchmark Lessons were developed with the help of the following sources:

Alpert, Mark. "How To Go To Mars." *Scientific American*, March 2000, pp. 44-51.
"Cognitave States." *Discover*, May 2001, pp. 35.

JPL's Planetary Photojournal, http://photojournal.jpl.nasa.gov/

Murr, Andrew and Giles, Jeff. "The Red Planet Takes a Bow." *Newsweek*, December 6, 1999, pp. 61.

The NASA Image Exchange, http://nix.nasa.gov/

Oberg, James, and Aldrin, Buzz. "A Bus Between the Planets." Scientific American, March 2000, pp. 58-60.

Robinson, Kim Stanley. "Why We Should Go to Mars." *Newsweek*, December 6, 1999, pp. 62.

Serway, Raymond A. *Principles of Physics*. Saunders College Publishing, Harcourt Brace College Publishers, Austin, 1994.

Simpson, Sarah. "Staying Sane in Space." *Scientific American*, March 2000, pp. 61-62.

Singer, Fred S. "To Mars By Way of Its Moons." *Scientific American*, March 2000, pp. 56-57.

Weed, William Speed. "Can We Go To Mars Without Going Crazy." *Discover*, May 2001, pp. 36.

Yam, Philip. "Invaders from Hollywood." *Scientific American*, March 2000, pp. 62-63.

Zorpette, Glenn. "Why Go To Mars?" *Scientific American*, March 2000, pp. 40-43.

Zurbin, Robert. "The Mars Direct Plan." *Scientific American*, March 2000, pp. 52-55.

Mission to Mars: Project Based Learning: Dr. Anthony Petrosino, Department of Curriculum and Instruction, College of Education, University of Texas at Austin,
http://www.edb.utexas.edu/missiontomars/index.html
Benchmarks content author: Elisabeth Ambrose,
Department of Astronomy, University of Texas at Austin
Project funded by the Center for Instructional Technologies,
University of Texas at Austin