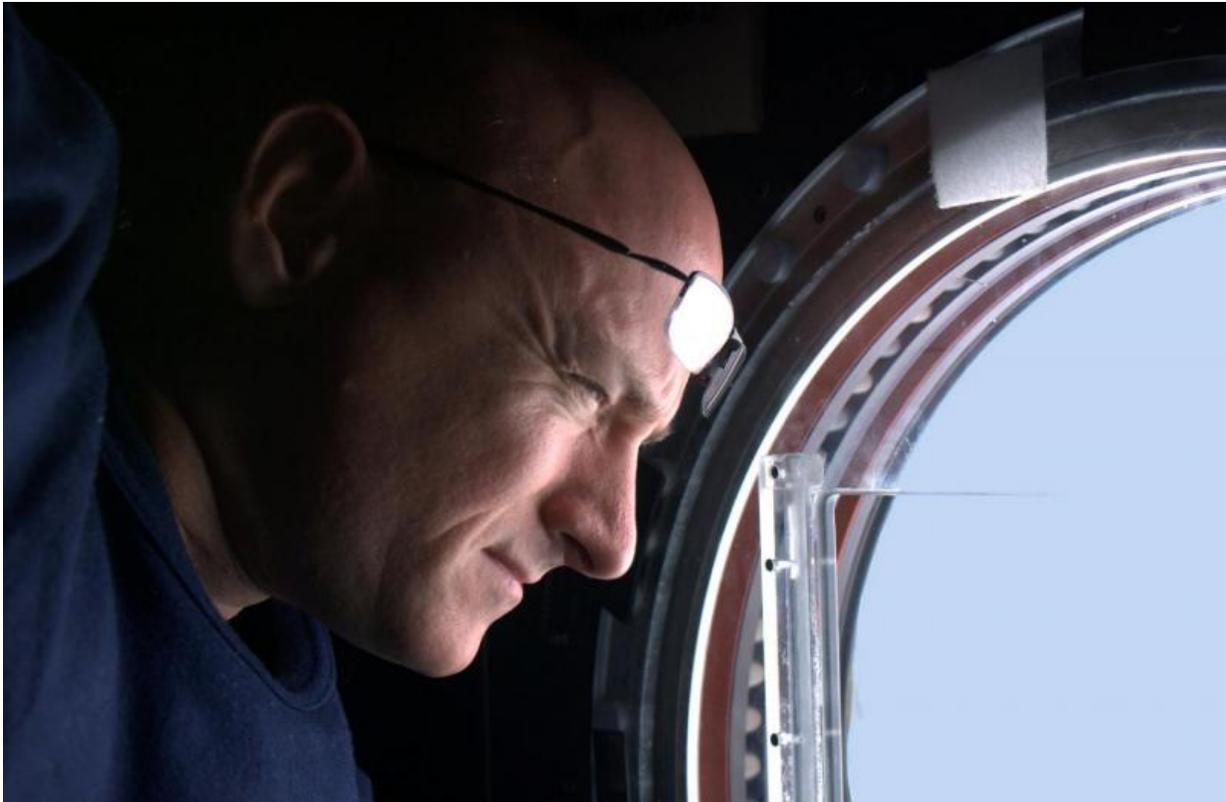


Journaling: Astronauts chronicle missions

October 20 2015, by Monica Edwards



Astronaut Scott Kelly watches the Earth go by from a cupola window. Isolation and confinement is a condition of expeditions to the space station. Journaling is one way to combat some of the effects. Credit: NASA

LOG ENTRY: SOL 25—Remember those old math questions you had in Algebra class? Where water is entering a container at a certain rate and leaving at a different rate and you need to figure out when it'll be

empty? Well, that concept is critical to the "Mark Watney doesn't die" project I'm working on.

I need to create calories. And I need enough to last four years. I figure if I don't get rescued by Ares 4, I'm dead anyway. So that's my target: four years.

- From: "The Martian" - a novel by Andy Weir

Weir's novel, *The Martian*, is largely told through the mission journals of astronaut Mark Watney, who is mistakenly left alone on Mars. Even though this story is fictional, journaling has and will always play an important role in any journey. It's a simple yet invaluable tool used by behavioral scientists to help assess the mental and emotional states associated with life in long-term isolation and confinement. The Human Research Program studies this at NASA.

As the Space Shuttle Program came to a close and NASA began focusing on much longer duration [space](#) missions aboard the International Space Station, Jack Stuster, behavioral scientist, began to wonder "if anyone had considered the behavioral issues that might be involved in long duration isolation and confinement in space." From this thought, the Behavioral Issues Associated with Isolation and Confinement: Review and Analysis of Astronaut Journals investigation was born.



Crew members agreed to journal at least three times per week either by typing on a laptop or recording audio files. Credit: NASA

The investigation, now in its second phase, focuses on the astronaut journals of each six-person [space station](#) crew. The objective is to identify equipment, habitat, and procedural factors that can help humans when adjusting to isolation and confinement while ensuring they remain effective and productive during future long-duration space expeditions, such as a journey to Mars.

While on orbit, astronauts write in their personal journals at least three times per week. Journals can be either typed on a laptop or recorded as an audio file. Journaling provides an outlet for emotions, Stuster said. They are a personal record of events and data that can be used to derive

recommendations for future missions.

NASA Astronaut Scott Kelly is participating in the journals investigation as part of the One-Year Mission aboard the space station.

"The journals are analyzed by first categorizing, and then counting," Stuster said.

Each statement in the [journal](#) entry is assigned to a primary category based on the subject of the statement; secondary and third-level categories also can be assigned, depending on the content. Then the statement is assigned a code to indicate whether the tone is positive, negative or neutral. From this, a metric is derived by subtracting the proportion of negative entries from the proportion of positive entries. Stuster calls the metric "net-positivity-negativity."

Phase one of the Journals investigation analyzed the journals of 10 NASA astronauts, both men and women, who spent an average of 188 days aboard the space station as members of two- and three-person crews. These participating astronauts wrote nearly 285,000 words in their journals—the equivalent of a 1,100-page book. Stuster is currently analyzing the journals of 10 additional astronauts who were members of a six-person crew, with the intention of comparing the results to identify any differences caused by crew size.

Stuster previously studied many exploration logs and personal journals from past explorers. He found there are highly predictable problems that will be encountered by future space crew, including strong-willed crew mates, cultural differences, misunderstandings and communication delays. To mitigate potential problems among crew members, Stuster said, team building exercises, training in intercultural relations, and instruction concerning coping strategies should be included in astronaut training for long-duration space expeditions.

Benefits of the study include learning how astronauts and cosmonauts find ways to adapt to the isolation, confinement and other stressors of life aboard the ISS. These insights will help NASA design equipment and procedures for future space exploration. Study results also show those of us on Earth that it is possible for people from different backgrounds and cultures to live in harmony, even under very stressful conditions.

Journals have been written as long as humans have been exploring. Mark Watney used log entries to chronicle his experience of being left alone on a planet in the novel. He hoped someone would one day find his journal and Earth would know he tried his best to survive. He also logged every problem he encountered and detailed his solutions. As NASA prepares for a journey to Mars, the journals of real astronauts are finding solutions to problems that future crew members might never encounter.

Provided by NASA

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