

NASA grapples with morality in Space

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On April 9, 1959, NASA introduced its first astronaut class, the Mercury 7. Front row (from left) Walter M. Schirra Jr., Donald K. "Deke" Slayton, John H. Glenn Jr. and M. Scott Carpenter; back row (from left) Alan B. Shepard Jr., Virgil I. "Gus" Grissom and L. Gordon Cooper Jr. Photo: NASA

LOS ANGELES — As NASA plans to send astronauts on long missions to an asteroid or even to Mars in the coming decades, the space agency must grapple with some thorny moral questions: How do they handle decisions on long-distance space exploration when it could endanger the health of the astronauts?

The space agency asked the Institute of Medicine (IOM) to offer guidelines to help NASA make such health decisions as it ventures into this unknown territory. The results, which were put together by a group of medical experts, were released Wednesday in a 187-page report.

Long spaceflights and exploration missions will "likely expose crews to levels of known risks beyond those allowed by current health standards," according to the report. Jeffrey Kahn of the Johns Hopkins Berman Institute of Bioethics led the team of authors. Missions may include both extended stays on the International Space Station and long missions to an asteroid or Mars.

The risks include radiation-induced cancers; loss of bone mass from long periods of time spent in zero gravity; nausea or fatigue from extreme radiation if astronauts get hit by a solar storm; and blurred vision.

And that's just a short list of the health hazards that researchers are aware of, not even counting the long-term psychological effect of dealing with stressful situations in a small space. Many of the risks are still unknown and cannot even be predicted, the report said.

Ethics Of Radiation Risks

Among the report's recommendations: Avoid harm by keeping risks to astronauts to a minimum. Make sure the benefits outweigh the risks enough for the mission to be worthwhile. Operate in an open and accountable way, and keep astronauts informed of the risks they face. Their basic message to NASA was: act in a responsible way and don't try to hide anything.

As it stands, any sort of long-term space travel could very well take astronauts past the current safe limits for radiation exposure, and this creates a problem for NASA. In 2011, NASA sent an exploration rover, Curiosity, to Mars to send back information about the red planet. A study that tracked the Curiosity rover's radiation exposure on its way to Mars, which took more than eight months, found that the round-trip journey could potentially exceed the currently acceptable limits for astronauts.

Radiation in space comes from high energy particles. On Earth, there are strict limits restricting a person's radiation exposure.

Scientists may have to figure out how to make the trip shorter or the spacecraft more protective. Another option, as one scientist put it, would be to consider “reassessing what level of risk we think is acceptable.”

So what does NASA do? Relax the current standards? Make a looser set of radiation exposure standards for long-distance space missions? No go, the IOM report said.

Pushing The Boundaries

“The committee finds relaxing (or loosening) current health standards to allow for specific long duration and exploration missions to be ethically unacceptable,” they wrote.

The only way to allow for such missions ethically is to grant an exception to the rule on a case-by-case level, they said.

“Exceptions to health standards should be considered on a mission-by-mission basis,” the study authors wrote. The exceptions should only be used in very limited situations and should follow the recommended guidelines.

Among its other considerations, the agency should also offer lifetime health care for its astronauts, the experts said. They also have to take into account that different astronauts may be able to tolerate different levels of risk. And they have to constantly monitor the astronauts and collect as much health data as they can while also protecting the astronauts' privacy.

In spaceflight, there always has been and will continue to be significant risk, the authors pointed out.

From the beginning, “human spaceflight has pushed the boundaries of acceptable health and safety risks for astronauts,” the study authors wrote.