

# People on Mars by 2033...or 2060

Washington, United States

On December 11, 2017, US President Donald Trump signed a directive ordering NASA to prepare to return astronauts to the Moon "followed by human missions to Mars and other destinations."

The dates fixed by the space agency are 2024 for the Moon and Mars in 2033, but according to experts and industry insiders, reaching the Red Planet by then is highly improbable barring a Herculean effort on the scale of the Apollo program in the 1960s.

"The Moon is the proving ground for our eventual mission to Mars," NASA administrator Jim Bridenstine said at a conference this week.

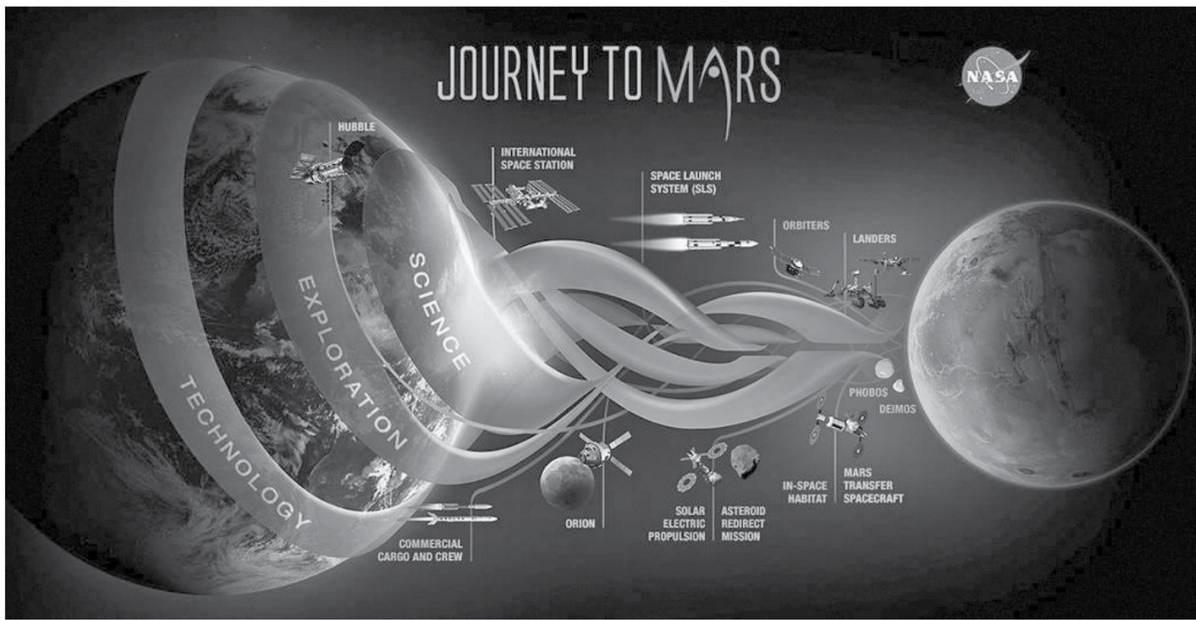
"The Moon is our path to get to Mars in the fastest, safest way possible. That's why we go to the Moon."

According to Robert Howard, who heads up the lab developing future space habitats at the legendary Johnson Space Center in Houston, the hurdles aren't so much technical or scientific as much as a question of budget and political will.

"A lot of people want us to have an Apollo moment, and have a president stand up like Kennedy and say, we've got to do it and the entire country comes together," he said.

"If that happened, I would actually say 2027. But I don't think that's going to happen. I think in our current approach, we are going to be lucky to do it by the 2037 date."

But Howard said if he were to be pessimistic, and assume political



NASA is developing the capabilities needed to send humans to an asteroid by 2025 and Mars in the 2030s (Courtesy of NASA)

dithering lay ahead, "it could be the 2060s."

## Psychological challenges

From the design, manufacture, and testing of the rockets and spaceships required to learning the best way to grow lettuce: all the groundwork remains to be done.

Just getting there will take six months at least, as opposed to three days to the Moon.

The whole mission could take two years, since Mars and the Earth are closet to each other every 26 months, a window that must be taken. Key tasks include finding a way to shield astronauts from prolonged exposure to solar and cosmic radiation, said Julie Robinson, NASA's chief scientist for the International Space Station.

"A second is our food system," she added. The current plant

system ideas "are not packageable, portable or small enough to take to Mars."

And then there's the question of dealing with medical emergencies: astronauts will need to be able to treat themselves in case of any accidents.

"I actually think a big deal is the suits," added Jennifer Heldman, a NASA planetary scientist.

One of the major gripes of the Apollo astronauts was their gloves, which were too inflated and prevented them from doing dexterous work.

NASA is developing a new suit, the first in forty years, called XEMU, but it won't be ready for its first outing in the International Space Station for a few more years.

On Mars, dust will be even more of a problem than on the Moon. The Apollo astronauts returned with huge amounts of lunar dust in their modules. Keeping it out of habitats will be critical for a mission that involves spending months on the Red Planet.

Techniques to exploit Martian resources to extract water,

oxygen and fuel necessary for humans to live there don't yet exist -- and must be tested on the Moon by the end of this decade.

Finally there's the most fundamental question: how will a group of people cope with the psychological stress of being to-

tally isolated for two years?

It won't be possible to communicate in real time with Houston mission control: radio communications will take between four and 24 minutes between the planets, one-way. NASA plans to test out delayed-communication



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NASA ADMINISTRATOR

tion exercises on board the ISS in the coming years.

Artificial intelligence must also be developed to assist and guide the astronauts.

A researcher commissioned by NASA to study the likelihood of getting to Mars by 2033 concluded the objective was "infeasible."

"It isn't just budget," said Bhavya Lal of the Science and Technology Policy Institute. "It's also organization bandwidth, how many things can NASA do at the same time?"

For Lal, the more realistic timeframe was 2039.



An attendee looks at a poster during the Humans to Mars Summit, which aims to advance humanity to the Martian surface by the 2030s, at the National Academy of Sciences in Washington

## US doctor sexually abused at least 177 students

● The probe looked into misconduct allegations from 1979 to 1997 reported by former students

● The victims included school athletes as well as other students

Washington, United States

A team doctor sexually abused at least 177 male students over nearly two decades and was never disciplined at the US school despite reports of his actions, an investigation found Friday.

Richard Strauss, who died in 2005, committed the abuse while employed at the school from 1978 to 1998, and university staff were made aware of claims as early as 1979, according to a 12-month independent probe.

The probe looked into misconduct allegations from 1979



Dr Richard Strauss

to 1997 reported by former students -- 150 of whom reported first-hand accounts of sexual abuse committed by Strauss.

In all, more than 440 former students and university staff believed to have information related to allegations involving Strauss were interviewed for the investigation.

The victims included school athletes as well as other students who saw Strauss at the university health center and at an off-campus private medical office.

Strauss established the private medical office in 1996 after he

was suspended from his activities as a treating physician at the school but remained a tenured faculty member.

University president Michael Drake said an independent investigation was launched into the allegations after they were brought to the university's attention last year.

"The findings are shocking and painful to comprehend," Drake said as he made the redacted investigation report public.

"On behalf of the university, we offer our profound regret and sincere apologies to each person who endured Strauss's abuse. Our institution's fundamental failure at the time to prevent this abuse was unacceptable -- as were the inadequate efforts to thoroughly investigate complaints raised by students and staff members."

### 'Escalated over time'

The abuse, which included "excessive" genital exams and fondling, "escalated over time" as students underwent a series



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of examinations, according to the report.

"We find this range of acts 'abusive' because they exploit-



ed the power Strauss enjoyed purely by virtue of his status in the doctor-patient relationship," it said.

Perkins Coie, the law firm that conducted the investigation, said it is also examining whether Strauss may have examined students of high school age while serving at the university.

While Strauss resigned from university medical staff at the end of 1994, he remained on the faculty until retiring as professor emeritus in 1998, an honorary status the university is revoking.

The university is covering the costs of counseling for those affected by the abuse.

Drake said his school has implemented safeguards since Strauss's departure, including a sexual violence consultation team, a centralized anonymous hotline, mandatory reporting of sexual assault for all university employees and mandatory sexual prevention education for incoming students, faculty and staff.

"Issues of sexual misconduct and abuse challenge our society in real and important ways," he added.

"It is our collective responsibility to remain ever-vigilant and work to ensure that this can never happen again."