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Astronotlar neden Mars’tan dönemezler?
Why can astronauts not return from Mars?

Returning humans to Earth from Mars is so impractical with current technology that we may just as well call it impossible. Certainly more cost-effective methods of rocket propulsion, manufacturing and hardware reuse have been developed in recent years. But businessmen, scientists and engineers are still bound by the same laws of gravity, motion and aerodynamics that Nasa faced in the 60s. Here are 4 reasons returning to Earth from Mars is much more challenging than the mission to the moon or a one-way mission to Mars.

1. **Higher gravity (than the moon)** - The gravity on Mars is more than twice that on the moon (about one third that of Earth). The cost of delivering a rocket and fuel required to escape the gravitational force of Mars is currently cost-prohibitive. Every kilogram of mass that lifted off the surface of the moon required 632 kilograms of hardware, tank and fuel to be launched from Earth. You will see below that the ratio for lifting 1 kg from the surface of Mars is over ten times more costly. Proposals have been made to build rockets or generate fuel with natural resources found on Mars. But mining equipment is very heavy and even if all the resources were neatly sorted in piles on the surface, the equipment needed to convert these into alloys and usable rocket fuel would be even heavier than hardware and fuel you planned to make in the first place. While possible in theory, these approaches go beyond current technologies.
2. **Longer distance** - It took the Apollo astronauts 3 days to traverse the 0.38 million km from the Earth to the moon. The shortest distance between Earth and Mars occurs about every 2 years and is about 78 million km or about 203 times farther than the the trip to the moon. This may look bad already but it gets worse. Application of the Hohmann transfer orbit principle shows that without ridiculous amounts of energy (say ludicrous speed) the shortest path from Earth to Mars is actually 593 million km or 1,543 times longer than the trip to the moon.
3. **Limits of rocket acceleration** - It is possible to imagine reaching enormous speeds by continually accelerating for a long time. The problem comes when you remember that you have to bring a heavy engine and enough fuel and the tank that holds it with you during all of that acceleration. In addition, you will need a nearly equal amount of fuel to decelerate upon arrival at Mars in order to safely land on the surface. Using multiple rocket stages and sending fuel supplies ahead of you helps reduce this problem but only to a small degree. What’s needed to fix this problem is a way to have the mass of the fuel (and perhaps the engine too) remain on Earth while transporting only the payload. Transmitting energy as light to the moving payload is one way to do this. But like nuclear engines, ion drives and magnetic propulsion these have not yet been made practical. Furthermore, even an engine with

100% efficiency would require enormous amounts of energy to traverse this distance.

4. **Supplies** - Based on numbers 2 & 3 above, the shortest possible trip to Mars with any technology is 6–8 months each way. The supplies required to sustain a crew for that period of time add even more mass to an already serious weight problem. Consider too the mass of supplies and shelter needed to sustain them while on Mars (assuming they don't turn and burn). Then the supplies for the return trip hit even harder because along with them you need to bring extra fuel and tanks to accelerate them out of Mars orbit for the journey home. Eventually some kind of agriculture could produce food on Mars, but that would take time to establish and more equipment to setup and maintain which in turn would increase the payload mass for Earth launch . Induced coma and deeper forms of hibernated states could reduce the total supplies needed but these are again risky, untested and not part of our current technology.
5. **Y**.Atakan Ekleme: Dönüş yolunda alınacak radyasyon dozu, gidiş dozuyla birlikte o kadar çok artacak ki, dönenlerin kanserden ölüm riskleri aşırı artacağından Mars'ta kalmaları daha iyi olacak.

The 2009 Nasa report "Austere Human Missions to Mars

" determined that a 4-person mission to Mars with return would require assembly of multiple hardware and fuel payloads in low Earth orbit delivered by the proposed Ares V rocket (larger and more powerful than the Saturn V). In all 13 launches of an Ares V would be needed just to get all the hardware, tanks, fuel and crew into low Earth orbit. That's the total number of Saturn V launches done during the entire Apollo project. And after all that we would only be in Earth orbit and no closer to Mars. Four more smaller rocket burns would propel separate payloads of hardware, fuel, supplies and crew out of Earth orbit toward Mars. Some of those payloads would eventually descend and land on the surface of Mars while others waited in orbit around Mars. After completing work on the surface, the smallest but most costly launch would take the crew and soil samples into orbit around Mars to rendezvous with the payload of fuel and supplies waiting there before burning out of Mars orbit back to the Earth.

Without the pressure of the cold war, there just isn't enough money or interest in the public or private sector to fund that large of an endeavor.

Surely there will be a manned mission to Mars and that could even be soon. But returning astronauts or civilians from Mars will require either presently unforeseen incentives or the development of technologies that don't exist today.

Update 12/29/2021

Perhaps the best explanation to understand why rockets are different from other transport vehicles and to help grasp the enormity of any space mission is the Ted Talk given by astronaut Don Pettit recorded at TEDxHouston in 2013. Don titled his talk "The tyranny of the rocket equation

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