A stop after landing in moon, people have wanted to accomplish an impossible task of visiting the red planet MARS. So far the trip to mars have been disastrous expect for the trips made by robots. We humans have acquired and depended on various and basic necessities to survive in this planet. But building, a colonization and having same necessities we have in earth is quite challenging. Communication between Mars and earth have been very successful but because it is light years away it does take time to receive the information.

The Challenger and Columbia space shuttle teaches us how crucial it is that everything works just right for the spacecraft to travel to space and successfully return back to earth. Also, considering the fact that designing a spacecraft that is vital for human survival has proven as a big challenge.



The distance between earth and mars is about 140 million miles. Light travels approximately 186,282 miles per second. The problem with the previous calculations is that they measure distance between the two planets as a straight line. Traveling through the farthest passing of Earth and Mars would involve a trip directly through the sun, while spacecraft is a necessity to orbit around the solar system's star.



The planets are continuously moving in their orbits around the sun. Engineers must calculate the ideal orbits for sending a spacecraft from Earth to Mars. Their numbers factor in not only distance but also fuel efficiency. Like throwing a dart at a moving target, they must calculate where the planet will be when the spacecraft arrives, not where it is when it leaves Earth. Spaceships must also decelerate to enter orbit around a new planet to avoid overshooting it.

 Although this isn't a problem for the closest approach, when the planets are on the same side of the sun, another problem exists. The numbers also assume that the two planets remain at a constant distance; that is, when a probe is launched from Earth while the two planets are at the closest approach, Mars would remain the same distance away over the course of the 39 days it took the probe to travel.

So far, NASA has had six successful Mars landers: Viking I and II, Pathfinder, MER Spirit and Opportunity, and Phoenix. However, all these missions were robotic missions with vehicles that were significantly lighter than a spacecraft carrying astronauts, supplies and fuel for a round-trip.Developing systems for a manned mission to Mars will require a careful balancing act between minimizing the weight and figuring out how to use the least amount of fuel possible.



To enter Mars orbit, scientists are planning on using a method called aero capture, which has never been tried before. "One of the problems of getting a spacecraft to another planet is that we first have to get it out of Earth's orbit," explained Engelund (author of EDL). "So we have to speed it up to a high enough velocity to break [free of] the Earth's gravity field. Then, when the spacecraft gets to its destination planet, it has to slow down enough so that it is 'captured' into orbit around that planet's gravity field." A process called aero braking has been used successfully in previous missions. Aero braking uses propulsion to first insert the spacecraft into orbit (orbit capture) and then circularizes (or achieves the desired orbit, otherwise known as orbit trim) by having the spacecraft pass through the upper part of the atmosphere several times. Aero capture, on the other hand, performs both the orbit capture and orbit trim in a single pass through the deeper atmosphere. According to him, this method requires a lot of fuel that has to be carried all the way until the spacecraft reaches Mars. It adds additional weight to an already heavier vehicle and is very expensive.

Prepared By

Rachel Alexander

As humans we have acquired a set of factors or needs and wants that help us survive, grow and develop as enlightened beings on this planet. The pursuit of clean air to breathe, water we drink, food to eat, and clothes to provide warmth and protection, is examples of such needs and wants. Nevertheless, colonizing any new planet is a challenge because of these factors. However, with new innovations and research such challenges can be met and overcome. Further, Mars being one of the prime candidates for future interplanetary exploration and human colonization, various scenarios and answers to such challenges have been devised.

One of the most challenging problems in Mars colonization is the need and supply of clean water. Experts have examined and concluded that the human body can “survive without food for up to two months” (Everitt 1). However, the human body can only last “one week” in good conditions or just “three to four days” without water (Spector 1). Therefore, finding a clean and renewable source for water is one of the greatest challenges faced when colonizing Mars. Nevermore, scientist at NASA has developed many ways to renew water so that it can be reused. One of NASA’s most important inventions for purifying water is the filter. A filter is used to remove impurities for water so that it is safe to consume. Further, NASA has designed and developed “the forward osmosis bag (FOB) system” (Levine 1). This bag is designed to “convert dirty water into a liquid that is safe to drink using a semi-permeable membrane and a concentrated sugar solution” (Levine 1). This meaning by passing the water through a special membrane that only allows small molecules, such as water, to pass through, while blocking larger molecules like salts, sugars, starches, proteins, viruses, bacteria and parasites, a clean water supply is able to be maintained. In addition, the FOB system can be incorporated into space suits in order to “to recycle metabolic wastewater” (Levine 1). This is to say; wastewater such as urine and sweat can be filtered and reused, using the FOB system. The FOB system will solve the issue of water when colonizing Mars in its primal state, until an atmosphere can be created on Mars. Nevertheless, these innovations show great promise for future exploration on Mars. In addition, investments in the FOB system are a great venture, because not only will it be needed for space exploration, but our future here on Earth. The Earth’s natural resources are depleting, and in many parts of the world finding clean and renewable water are difficult. However, with the FOB system dirty water can be reused and rationed to benefit all of humanity.

Nonetheless, finding sources of food on Mars will be a challenge. The majority of Mars is seen as desert waste lands through satellite space photos. However, it has been tested in military and space travel that dry foods can provide a good source of nutrition. For the pioneers of Mars settlement this will be there main dietary meal. This meaning, meals will be “freeze-dried on Earth then rehydrated” on Mars, as they do for the International Space Station (Bresnahan 1). Nevertheless, a dietary meal will have to be created for each settler on Mars and food will have to be rationed. Therefore, a constant flow of dry foods will have to be sent from earth to settlers, which will then be rationed. In addition, food will have to be properly stored to prevent spoilage. However, supplies can be sent from Earth to create a greenhouse for plants. A variety of plants will be planted to supply food and Oxygen. After several years the green house will provide oxygen to create an atmosphere such as Earth’s. These supplies will have to be sent from Earth and arrive at a drop point on Mars, where the settlers can easily pick up resources.

As the plants help us create a clean and constant flow of air, this is a plan that may take will years to complete. During the beginning of Mars settlement, pioneers will have to rely on water electrolysis. Water electrolysis is the process of using “electricity from… solar panels to split water into hydrogen gas and oxygen gas” (Barry 1). This innovation will provide the first settlers of Mars with clean and renewable air. This can be supplied in all living areas of the settlers and homes. In addition, air tanks and supplies can be sent ahead of time so when these new settlers arrive on Mars resources will be available for them. Nevertheless, pressurized rooms and suits will be created to keep the air in and create atmospheric pressure like on Earth.

The Mark-III Space Suit is an example of such an innovation. The Mark-III Space Suit provides an “adequate carbon dioxide (CO2) washout inside the helmet to prevent symptoms of hypercapnia” (Meginnis 1). This is to say, these suits provide the proper amount of carbon dioxide disbursement to create breathing conditions like on earth. Nevertheless, space suits such as the Mark-III are being developed to provide many more features to better living conditions. In the beginning of Mars settlement space suits will have to be worn at all times. Once an atmosphere is established on Mars, space suits on Mars will be a thing of the past.

Ultimately, these new innovations such as the FOB system, dry food/ flash frozen food, water electrolysis, and space suits like the Mark-III, will solve many dilemmas when facing Mars exploration. Nevertheless, the investment in such innovations can show great profit in future endeavors. This is because these innovations will not only assist in space exploration and Mars colonization, but also many problems facing Earth’s environment.

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Living Conditions

What is more difficult the journey or the end of the journey. The trip was not easy, we don’t want to say the hardest part is over but with the right skills, organization and technology we can make our time on Mars successful. With the cost of more than 10,000 dollars a pound (NASA) we strive to maximize all the resources we have available.

We have to perform the analysis to decide the optimal amount of people to bring on the mission. The selection process ranks among one of the most important in human history. These select few who will shape the next chapter in human history.

Before we decide on the amount of people and make plans for the long time occupation of Mars we have to explore the structure of the society on Mars. We look at settlements that were a product of slow growth and isolation. We perform this analysis to explore similar situations that will face our explorers as they live in tremendous isolation.

Case Study

The island of Tristan da Cunha is a town located on an island 1000 miles from the next closest settlement. First settled by the British as a strategic point to prevent French forces from occupying the island as a base, the island was settled when a few people decided to remain. From a community of a few British officers, since the 19th century the population has grown to approximately 300 people. Since the islands settlement. The people on the island lived self-sufficiently, their economy has been based of fishing and because of the remote location, and communication is slow with the outside world. Their infrastructure is not stable for their continued inhabitance; plans need to be drawn up where equipment and shelters can be modified. The same boring conditions would create frustration with the settlers on Mars. We must also plan for the economic development and economic flexibility of the Mars settlement.

A situation occurred in 1960 when a volcano on the island erupted and all the inhabitants where evacuated to England. When the time arrived to go from the modern and social world of England back to the isolated island 94% of the settlers chose to go back to the island. Only 16 people, all young remained. It can be concluded that older people are more adverse to change, we have to account on fulfilling the needs of the new generations to ensure the continuity of the project on Mars.

Based on the case study, it would be too prudent to build the completed settlement as quickly as possible. The settlement project must be ongoing. The settlement project should be an area of discussion for the settlers and the habitat needs to be shaped around the needs of the people.  The goal here is to keep people busy and sociable.

Continuing Projects

Food

The technical aspects of providing the basic needs of the people are not simple; factors that affect our plans are the wild changes in weather, atmospheric pressure and the terrain. Luckily, for us we have a plethora of information provided from the Mars Rover about the terrain and environment on Mars. We cannot afford to focus on single strategies to produce a self-sustaining food production cycle. Fortunately we can offer two options to produce the food needed the by colonists. The end goal is to attempt to transform Mars environment into a more human friendly environment.

The truths are that the oxygen on Mars accounts for 1% of the air compared to the 20% on earth, the temperature can fluctuate from   -200 degrees Fahrenheit to +150 degrees Fahrenheit. There are no plants on earth that can survive such adverse conditions.

The first option is to use the Martian soil as we use earth soil to grow plants. This process is not without it difficulty. However, rest assured we have solutions for the problems with the temperature fluctuations and soil quality. This involves creating a greenhouse unlike anyone one earth, we need to use oxygen regulators set to near earth oxygen levels.

The second option is to maintain a hydroponic solution. Plants would be cultivated in a controlled environment in water along with the essential nutrients and artificial light this requires more budgeting for water.

Prepared By

Byron

Traveling outside of earth is scary because you will be isolated and won’t have anyone with you depending on the mission you are doing. We have advanced our technology so far that we are able to communicate throughout the solar system so when we send people over to mars we can stay in touch with them. That means if any problem arises the astronaut can easily contact earth for any help that is needed. Even if you are on another planet we have satellites orbiting all around earth so you can still communicate with us but depending on how far you are there might be a small delay.

We have already sent shuttles to mars to test out the air and take samples so by the time we send people over to mars we are prepared. One thing we have sent over to mars is something called the mars rover, which is currently mapping out anything interesting on mars that we need to know about. Currently the mars rover takes about 3-22 minutes for information to reach earth, which is a big deal because if we couldn’t communicate with it the mission would have failed. All communications between mars and earth go through satellites and because of the huge distance between us that is why there is a delay. While on mars we are already aware of all the communication problems that would occur and have a strategy for it. A problem that might occur is we trying to have a phone call with the mars residents, because since there is a small delay it might be too difficult to try out. Our best bet of communication will be to try and send emails, text messages or use Whats App and the only downside of these methods will be the 6-minute delay to get your reply. Going to a new planet to start fresh will always bring some problems with it but they can easily be solved with some assistance from earth. On earth we have solved many tough challenges so if we stick our minds together we can get through just about anything. We will have the smartest minds of earth just a few minutes away waiting on call that will be able to assist our fellow mars residents.

Living on mars will be difficult because you won’t be able to do certain activities like when you were living on earth. Luckily for them we are able to provide them the ability to surf on a number of websites that we have downloaded on earth to the mars habitat web server. We have enough storage to allow people to have access to their favorite websites by pre-downloading them but they won’t be able to surf other websites because of the delay. This will provide the residents of mars some type of resemblance of when they are on earth so they won’t feel home sick or get bored while on mars. They can also watch their favorite shows when they have some downtime. When they are not working having a computer at hand will help relieve any stress they have amassed since moving to mars to live permanently.

Mars is a whole new world for do and us to explore so the first thing we should try is start a reality TV. Show. We will use this as a chance to show the people of earth what mars looks like and what will be going on. We can record the life of the people living on mars and broadcast it back home, which will be fun for both sides. This will be just like any reality TV show but it will be recorded on mars and sent back to earth for all to see. On earth reality TV shows make a lot of money and all they show are nonsense so just imagine how many viewers will try to watch a show made on mars. Everyone on earth will tune in to watch because we have all dreamed of living on mars and getting away from everything but have been too scared to do anything about it. Now we can actually watch people live on mars and decide for ourselves whether or not this can be something we can live with. It won’t just end with this we can also shoot movies on mars, just think about how much money people will pay to record movies on another planet. Having a reality TV show on mars will contribute greatly to any costs we might need to cover while living on mars. We can end up making more money than what we spent getting to mars and setting up a habitat.

Prepared By

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