Review Paper

About the Space Robots

Relly Victoria Virgil Petrescu

ARoTMM-IFToMM, Bucharest Polytechnic University, Bucharest, (CE), Romania

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Corresponding Author:
Relly Victoria Virgil Petrescu
ARoTMM-IFToMM, Bucharest
Polytechnic University,
Bucharest,
(CE), Romania
E-mail: rvvpetrescu@gmail.com

Abstract: Today, robots help us more than ever in all major operations, everyday life and become a daily reality, making it an integral part of major human projects. If they are still the majority in the machine industry, they will soon become as many in other industries and at the same time will grow strongly for human support in conquering extraterrestrial space in an extended campaign robot will have a role. We already have orbital space stations with robots, followed by others in the form of colonies on the Moon and on Mars and then a continuous expansion. At the same time, the expansion of scientific research and robot exploration, which has already exceeded the limits of our solar system, but unfortunately the power of the fission power fission, does not allow the probe to have greater autonomy at this time, which is imperative plus the development of robotic and automated systems to create new spatial energy sources. Opportunity (known as MER-B) or MER-1, called Oppy, is a robotic engine fueled from 2004 until the end of 2018. At NASA, Mars Exploration Rover landed at Meridiani Planum on January 25, 2009, ceased to communicate in 2010, while Opportunity managed to remain operational for an area of 5111 meters after landing, recharging solar batteries and hibernation storms. This careful operation allowed Opportunity to exceed its operating plan by 14 years, 46 days (during the Earth), 55 times the projected lifespan. Until June 10, 2018, when he first contacted NASA, Rover traveled at a distance of 45.16 km. The most important missions included the initial 90-mile mission, finding extramarital meteorites such as the Rock of Heat Shield and over two years exploring and studying Crater Victoria. Rover survived the moderate dust storms and in 2011 reached the Endeavor crater, which was described as the "second place to land." The Opportunity mission is considered one of NASA's most successful adventures. Curiosity is a small machine designed to explore the Mars Gale Crater within the NASA mission, Mars Science Laboratory (MSL). Curiosity was launched from Cape Canaveral on November 26, 2011, at 15:02 UTC and landed on Aeolis Palus in Gale on Mars on August 6, 2012, at 5:17 UTC. The Bradbury Landing Point was less than 2.4 km (1.5 mi) from the rover's target center after a 560-million-mile journey. The objectives of the rover include an investigation into Martian climate and geology; assessing whether the site selected in Gale has ever provided environmentally friendly environmental conditions for microbial life, including investigating the role of water; and studies on planetary habitats in preparation for human exploration.

Keywords: Robots, Mechatronic Systems, Structure, Dynamics, Dynamics Systems, Machines, Space, NASA, Colonies on the Moon and on Mars

Introduction

Today, robots have not only penetrated microchips in electronics but also in medicine, where it helps to perform difficult operations, especially when precision is required, the size being small and any human error could be fatal to the patient. Robots help the doctor in the heart, brain, kidneys, without mentioning bone implants and repair of broken teeth, cartilage and muscles. In this area, new materials adapted to the requirements of the human body also play an important role. Robotic systems used in today's operating blocks are very costly and bulky and must be permanently adapted and prepared before a difficult operation, but ultimately their help is unmatched because the operation takes place by machine and the computer can accidentally carry hundreds of millions of giant nerves, a blood vessel, healthy tissues and everything else. The assisted operation brings infinitely more advantages than the disadvantage that the operating block is voluminous and costly. However, in addition to space, costs are amortized over time and satisfying successful operations is excellent for both patients and the medical team. Surgery has taken advantage of this technology relatively late. The initial use of robots in surgery began in the late 1980s when an industrial robot was used to support instruments for stereotactic biopsy in neurosurgery. Also, in the late 1980s, IBM built the first robot used in clinical practice, called Robo-doc. The first use of a robot in human surgery was for transurethral resection of the prostate. In 1993, Computer Motion, Inc. introduced a voice-controlled arm, AESOPTM (Optimal Endoscopic System for Optimal Positioning), used to support optical instruments in laparoscopic surgery. Its version, AESOPTM 2000 is the first man-controlled robot approved by the US Food and Drug Administration. In 1998, Reichenspurner introduced the ZEUS microsurgery system in Germany. Today, the most complex and efficient robot in use is the daVinci system. With the birth of laparoscopy and information technology, the operation entered a new era. The development of surgical robots is primarily motivated by their desire to increase the efficiency of surgical interventions. Medical actions are based on information from various sources, including patient-specific data (vital signs and images of human body tissues and organs), general medical knowledge (atlases of human anatomy) and medical experiences. First, a robot can usually make things more accurate than a man. This provides the first motivation for using CAD/CAM systems. Robots can be used successfully if the patient has been radiated (e.g. radiography) without endangering the health of the medical team. Since ancient times, human imagination has been preoccupied with the idea of making machines equipped with artificial intelligence to perform similar operations to mankind. Technicians have been using for many years in various non-medical fields, such as the automotive industry, the underwater environment, extraterrestrial space or areas exposed to the risk of nuclear radiation.

A robot is a mechanic or practically artificial engineer. The robot is a system composed of several elements: mechanical, sensors and actuators, as well as a steering mechanism. Mechanics determine the robot look and possible movements during operation. Sensors and servomotors are used when interacting with the system environment. The steering mechanism ensures the robot successfully accomplishes its purpose, for example by evaluating sensor information. This mechanism regulates the engines and plans the movements to be made. Robots with human form are called androids.

The basics of today's robots are far away. The first car models can be called automatic (coming from the Greek car, moving alone). They could do one purpose, being constrained by construction.

The Greek mathematician, Archytas, has, according to some findings, built one of these automated premieres: a steamed pigeon that could fly alone. This wooden cavity was filled with pressurized air. It had a valve that allowed opening and closing with a counterweight. There have been many models over the centuries. Some have made the work easier and others have served to people's amusement.

With the discovery of the fourteenth-century mechanical clock, new complex possibilities were opened. Not long after, the first cars that resembled today's robots appeared. However, it was possible for the movements to take place one after the other without the need for manual intervention in this system.

The development of electro-technical technique in the twentieth century brought with it a development of robotics. Among the first mobile robots are the Elmer and Elsie system built by William Gray Walter in 1948. These tricycles could indicate a light source and recognize collisions.

1956 is considered the birthday of the industrial robot. George Devol applied this year in the US for a patent for "scheduled article transfer". A few years later he built together with Joseph Engelberger UNIMATE. This Robot Approx. two tons were first introduced into the installation of TV iconoscopes and then entered the automotive industry. The programs for this robot have been saved as directional commands for motors on a magnetic cylinder. Since then, industrial robots, such as UNIMATE, have been introduced into many production areas and are continually developing to meet the complex requirements that are required.

Strong growth of robots in film and literature draws science's attention to this type of car. The scientific field, which deals with the construction of robots, is called robotics. The term was first used in 1942 by Isaac Asimov in his book Runaround. There is no theoretical field of robots. These are mainly computer subdomains.

Most stories about robots written by Asimov take place in the first era of positronic robotics and exploration of space. The special feature of robots in the Asimov universe is related to the three laws of robotics implanted in the positronic brain, to which all the robots of the Asimovic fiction must obey, assuring the transmission of information to the creators.

Colonization of the Moon is a proposed project for creating a permanent human community (or a robotic settlement) on the Moon (Fig. 1 and 2).

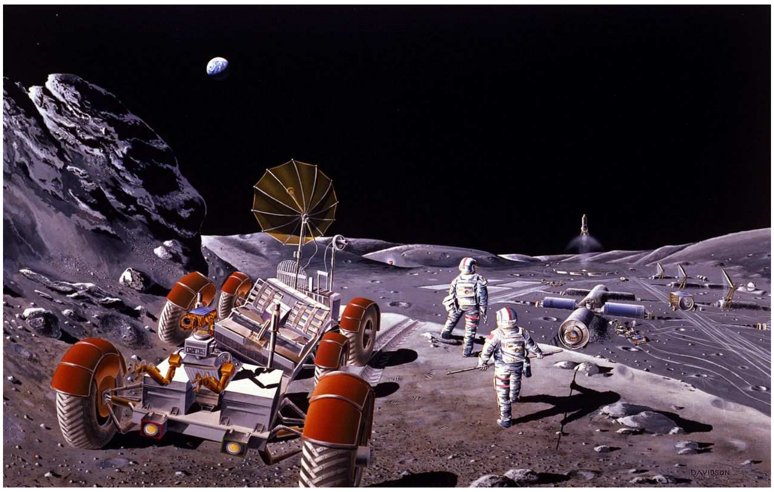

Fig. 1: Colonization of the Moon. A concept from 1984

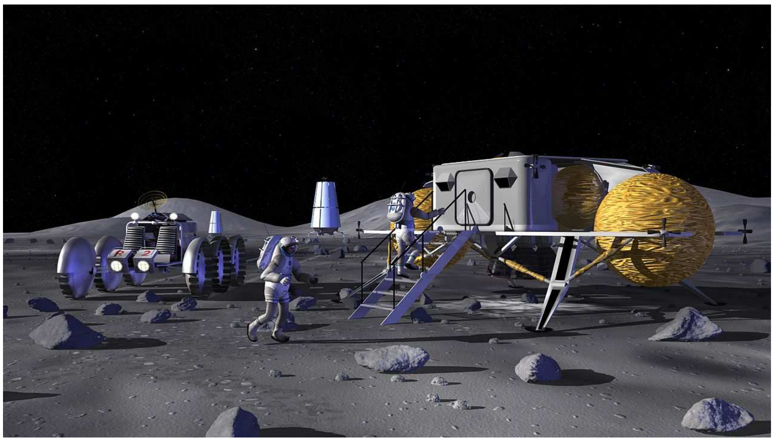

Fig. 2: Colonization of the Moon. A concept from 2006

Recent research shows that water could be present in notable quantities in the monthly fields, renewing interest in Earth's satellite. Polar colonies can also avoid the problem of long lunar nights, about 354 hours, slightly more than two weeks and take advantage of the Sun continually, at least in the local summer (no winter data yet).

The permanent human dwelling on a planetary body other than on Earth is one of the most widespread subjects of science. As technology advances, concerns are growing about the future of mankind on Earth, arguing that space colonization is an achievable objective and deserves to be amplified. Due to its proximity to Earth, the Moon has always been seen as the most obvious place for the primordial expansion of human space.

Ideas about the location of a colony on the Moon date back to the era of space. In 1638, John Wilkins writes "A New World Speech and Another Planet" in which he predicted a human colony on the Moon. Konstantin Tiolkovski, among others, has also suggested such an event in the future. Since the 1950s, many concepts and models have been suggested by scientists, engineers and so on.

In 1954, Arthur C. Clarke proposed monthly modules with insulated, dust-proof inflatable insulation. Also, a spacecraft, assembled in Earth's low orbit, was to be launched on the Moon and astronauts built iglu modules and an inflatable radio mast. Other ideas included the establishment of a larger permanent home; an air purifier based on algae; a nuclear reactor for energy supply; and electromagnetic catapults to launch products and fuel for interplanetary spacecraft.

In 1959, John S. Rinehart suggested that the safest method of design would be a structure that could "float in an ocean full of stationary dust", at that time it was a theory that there are oceans of dust at the deep depth of satellite 1-1,6 km. The proposed project consisted of a cylindrical construction with halves of a dome at both ends and a micrometric shield placed above the base.

Fig. 3: Colonization of the Moon. An Elon Musk concept

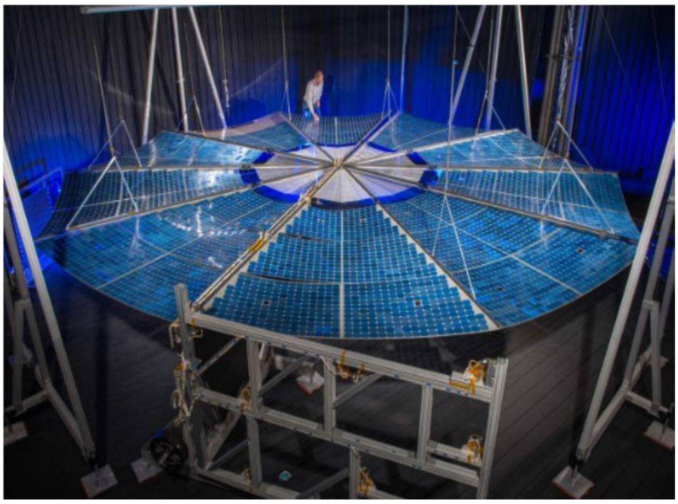

Fig. 4: The Development Engineer Unit (UID) of each design has been built to produce 20kW nominal power using the photovoltaic triplet-junction standard

Fig. 5: UID deployed and unloaded in a thermal configuration used in a vacuum

The images, titled "Moon Base Alpha," show the Interplanetary Transport System rocket and the first base that SpaceX wants to build on the Moon (Fig. 3).

For Elon Musk, the base of the Moon would be just the first step towards colonizing Mars, its true stake, proof that in the Twitter message it also presented an image of the future "Martian City" he dreams about.

However, it is clear to everyone that the first step in human expansion in the universe is today a colony per month, followed by the first colony on Mars at step two (Engineering Design for Human Exploration - Energy and Power, NASA; Rulkov *et al*., 2016; Agarwala, 2016; Babayemi, 2016; Gusti and Semin, 2016; Mohamed *et al*., 2016; Wessels and Raad, 2016; Maraveas *et al*., 2015; Khalil, 2015; Rhode-Barbarigos *et al*., 2015; Takeuchi *et al*., 2015; Li *et al*., 2015; Vernardos and Gantes, 2015; Bourahla and Blakeborough, 2015; Stavridou *et al*., 2015; Ong *et al*., 2015; Dixit and Pal, 2015; Rajput *et al*., 2016; Rea and Ottaviano, 2016; Zurfi and Zhang, 2016 a-b; Zheng and Li, 2016; Buonomano *et al*., 2016 a-b; Faizal *et al*., 2016; Cataldo, 2006; Ascione *et al*., 2016; Elmeddahi *et al*., 2016; Calise *et al*., 2016; Morse *et al*., 2016; Abouobaida, 2016; Rohit and Dixit, 2016; Kazakov *et al*., 2016; Alwetaishi, 2016; Riccio *et al*., 2016 a-b; Iqbal, 2016; Hasan and El-Naas, 2016; Al-Hasan and Al-Ghamdi, 2016; Jiang *et al*., 2016; Sepúlveda, 2016; Martins *et al*., 2016; Pisello *et al*., 2016; Jarahi, 2016; Mondal *et al*., 2016; Mansour, 2016; Al Qadi *et al*., 2016b; Campo *et al*., 2016; Samantaray *et al*., 2016; Malomar *et al*., 2016; Rich and Badar, 2016; Hirun, 2016; Bucinell, 2016; Nabilou, 2016b; Barone *et al*., 2016; Chisari and Bedon, 2016; Bedon and Louter, 2016; Santos and Bedon, 2016; Minghini *et al*., 2016; Bedon, 2016; Jafari *et al*., 2016; Chiozzi *et al*., 2016; Orlando and Benvenuti, 2016; Wang and Yagi, 2016; Obaiys *et al*., 2016; Ahmed *et al*., 2016; Jauhari *et al*., 2016; Syahrullah and Sinaga, 2016; Shanmugam, 2016; Jaber and Bicker, 2016; Wang *et al*., 2016; Moubarek and Gharsallah, 2016; Amani, 2016; Shruti, 2016; Pérez-de León *et al*., 2016; Mohseni and Tsavdaridis, 2016; Abu-Lebdeh *et al*., 2016; Serebrennikov *et al*., 2016; Budak *et al*., 2016; Augustine *et al*., 2016; Jarahi and Seifilaleh, 2016; Nabilou, 2016a; You *et al*., 2016; 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Liu *et al*., 2013; Padula and Perdereau, 2013; Perumaal and Jawahar, 2013; Petrescu, 2011; 2015a; 2015b; Petrescu and Petrescu, 1995a; 1995b; 1997a; 1997b; 1997c; 2000a; 2000b; 2002a; 2002b; 2003; 2005a; 2005b; 2005c; 2005d; 2005e; 2011a; 2011b; 2012a; 2012b; 2013a; 2013b; 2013c; 2013d; 2013e; 2016a; 2016b; 2016c; Petrescu *et al*., 2009; 2016; 2017a; 2017b; 2017c; 2017d; 2017e; 2017f; 2017g; 2017h; 2017i; 2017j; 2017k; 2017l; 2017m; 2017n; 2017o; 2017p; 2017q; 2017r; 2017s; 2017t; 2017u; 2017v; 2017w; 2017x; 2017y; 2017z; 2017aa; 2017ab; 2017ac; 2017ad; 2017ae; 2018a; 2018b; 2018c; 2018d; 2018e; 2018f; 2018g; 2018h; 2018i; 2018j; 2018k; 2018l; 2018m; 2018n).

Materials and Methods

Today, robots help us more than ever in all major operations, everyday life and become a daily reality, making it an integral part of major human projects. If they are still the majority in the machine industry, they will soon become as many in other industries and at the same time will grow strongly for human support in conquering extraterrestrial space in an extended campaign robot will have a role.

We already have orbital space stations with robots, followed by others in the form of colonies on the Moon and on Mars and then a continuous expansion.

At the same time, the expansion of scientific research and robot exploration, which has already exceeded the limits of our solar system, but unfortunately the power of the fission power fission, does not allow the probe to have greater autonomy at this time, which is imperative plus the development of robotic and automated systems to create new spatial energy sources.

The most important at this point is the realization of sustainable energies in outer space.

Now we have several variants available. One still works at the industrial scale of the nuclear fusion reaction, but instead, we have many NASA specialists made up of many concentrated solar energy capture systems, systems that will be extremely useful for the first colonies to be made on the Moon and on Mars, but also for aerospace vessels and space exploration modules.

NASA is developing a strategy for sending a crew to Mars by 2030. To achieve this goal, NASA plans to develop technology for long-haul flights, including advanced transportation systems and live systems. Of these technologies, solar electric propulsion (PES) has been identified as very effective in moving large masses through interplanetary space.

For decades it has been known that missions outside Earth's low orbit can be cost-effective by PSA, but such space missions have not yet been carried out as manufacturing technology is not advanced enough. Recent investments by NASA in solar propulsion systems and propulsion systems have matured, so the 50 kW PSA is already ready for missions.

It has been shown analytically that these technologies can be resized to systems with several hundred kilowatts of power.

It is expected that these technologies will be demonstrated in missions farther from Earth, gaining confidence in this system before engaging in Earth-independent missions.

These missions will advance the human exploration capacity of the current, earth-dependent phase.

Recently, NASA has developed two critical technologies for high power PES: (4) flexible solar panels and HET magnetic protection systems (5). Both technologies have been built and tested to demonstrate PES availability at 50 kW. A key component of these flexible solar panels is their very small mass and very small storage space. An essential feature of the propeller is its ability to process a large amount of propellant with a very low degradation factor for High-Delta-V missions. Both technologies can be quickly moved to a much higher power level.

Flexible solar panels are based on new structures that provide a large and small soils collection area. To do this, traction nets instead of rigid panels have been used to reduce weight and storage. Two models of flexible panels were built.

One with a rectangular launch design called the "Roll-Out Solar Array" (ROSA).

The second is a circular design called "MegaFlex on the ATK orbit".

ROSA is deployed by the amortized release of stress-energy stored in laminated composite arms extending a photovoltaic sheet attached to a rod connecting the outer tips of the two arms.

Mega FLex runs through a motorized strap, which first extends an articulated arm and then rotates a swing panel of 360° to unlock a photovoltaic blanket. The arm increases the radius of the circular shaft without increasing the length of the panel.

The project development unit (UID) for each project was built to produce a nominal power of 20 kW using a triple junction photovoltaic cell standard. Acoustic and vibrational photovoltaic tests have been performed to determine the resistance to launch (EDHE-Energy and Power, NASA).

Testing assays were performed in vacuum at +60 degrees to determine autonomic functionality under relevant conditions.

Resistance and resistance tests have also been performed.

These tests have convinced NASA that both models are ready to be incorporated into a mission that normally requires 40kW of solar energy.

This system is intended for renewable combustion cells in the first Outpost of the Moon (Fig. 6). The materials used are of the highest quality and use nanotechnologies.

In the summer of 2005, Glenn demonstrated the first regenerative regenerative regenerative cell. He finished five cycles day and night. These five days of operation were the result of several years of hard work. Team diligence has been paid to demonstrate the potential of renewable combustion cells as an energy storage device for aerospace solar systems.

Starting with the 2005 demonstration, the team has modified and upgraded much of the software, circuits and hardware to make the system work more reliably.

In November 2006, the Johnson Space Center, Houston, TX, presented "Monthly Exploration" to the authors of the Human Exploration Project of ITEA (Fig. 7 and 8).

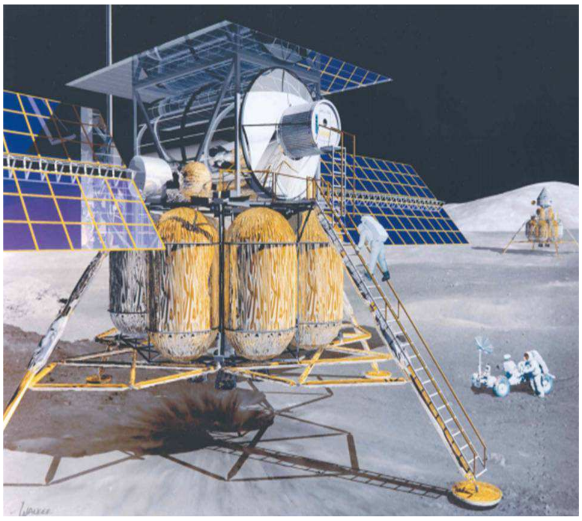

Fig. 6: First Lunar Outpost regenerative fuel cells

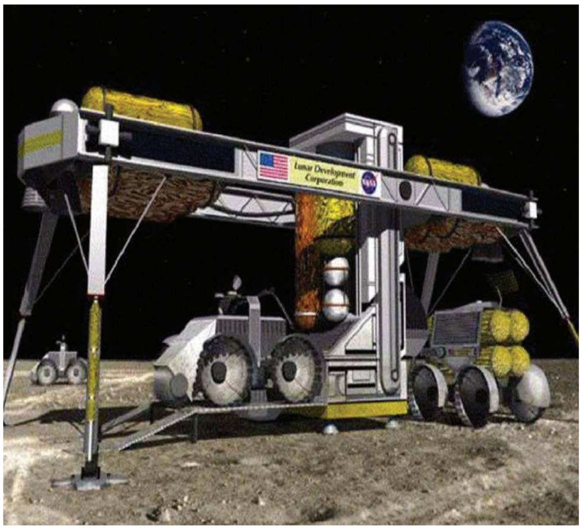

Fig. 7: Steel frame and modular structures

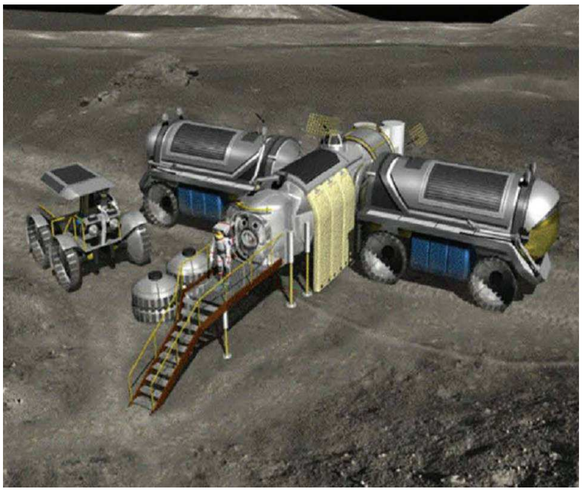

Fig. 8: Steel frame and modular structures

Besides these tests, analyses were made to determine the feasibility of measuring these solar panels at 125 kW per "wing".

The MegaFlex concept can be increased by increasing the diameter of the panel and the number of columns.

Analyzes show that two 30-meter wings can bring extra power of 440 kW using a multitude of metamorphic photovoltaic intersections (MMI) and still fit into the test room and on the 8.4 m 25 m armchair to launch.

Astronauts live and work in orbit and the Houston Mission Control Center practically never sleeps. The International Space Station is a permanent space colony, inaugurated one year before the 2001 Space Odyssey icon.

One remains fascinated by the possibilities, discoveries and movements of space. Especially sci-fi. The Gravity movie in 2013 with Sandra Bullock and George Clooney brought hundreds of millions of dollars to the box office and won seven Academy Awards. And the movie Life (2017) is an extraordinary one. But we are indifferent to what is happening in reality. Without fanfare, I entered the era of Captain Kirk and Spock. We know fictitious characters better than real ones. Perhaps it is not surprising that the daily life of the post does not have the drama of a film script, but we will try to find out in this article how to live in space for six months.

The International Space Station is a huge outpost. From the edge of a solar panel to the edge of the opposite, the station measures just as much a football pitch and weighs about 450 tons. It is so great that it can be seen with the naked eye at night. This is also due to low orbit at an altitude that varies between 319.6 km and 346.9 km. The orbital speed is 7.67 km/s or 27,600 km/h. An orbit (rotation around the Earth) lasts 92.65 minutes and one day the station is approximately 15.54 times a bypass of the Earth.

Five major space agencies are participating in this project: NASA (USA), RKA (Russia), JAXA (Japan), CSA (Canada) and ESA (European Space Agency). The responsibilities of the station's navigation and operation are divided and the role of station commander is replaced by Americans and Russians. American and Russian astronauts work in their modules, but crews often have tables after work hours.

The space station is both a space ship and a house. He has his personality with good and bad things. Crew members come and go, bringing their own style, but the station itself imposes a certain rhythm and tone. It has a much more sophisticated system of water recycling than on Earth. An astronaut who mixes an orange drink for breakfast on Monday morning and urinates in the afternoon can use the same purified water to make a fresh drink on Thursday. However, the station does not have a refrigerator or freezer for food (there is a freezer for scientific experiments). Even though food is much better than 20 years ago, most of it is still in a vacuum or canned. The arrival of oranges every two months on the ship is a reason for the party.

In 2009, with the expansion of the International Space Station, the US installed some private cabinets. Here astronauts can sleep and enjoy hours of intimacy and quiet, away from video cameras. Each cab is upholstered in white material and fitted with a sleeping bag attached to an interior wall.

Mike Hopkins, who "lived" on the international space station for six months, says that "on Earth when I had a long day when I was physically and mentally tired and sitting on my bed, it was a weak feeling for my feet.

Some astronauts connect with some strings that somehow feel in a bed. "The astronauts who let their arms out of the sleeping bag float freely and look like ballet dancers," says Hopkins.

Hopkins says he does not have unusual dreams in space, though now back to Earth, he sometimes dreams of floating through the station.

On the station, even the ordinary becomes strange. Exercise Bike for American astronauts does not have a handlebar. She does not even have it. Without gravity, you can watch a movie while pedaling, letting your laptop float anywhere you like.

Astronauts had to be careful not to stay in a place for too long. Without gravity to help circulate the air, the expired carbon dioxide tends to form a cloud around the head and can lead to headaches. The station is equipped today with fans to solve this problem.

Since the launch of the first components, 216 men and women have lived on the station and NASA has learned a lot about how you can live in space - about moving from gravity to zero-G and how to survive months without gravity.

Life on the station does not look like anything on Earth. It's more interesting. And when astronauts go out into space, they can be both palpitating and dangerous. Space is a cold and unforgiving place - a wrong maneuver can trigger a disaster. NASA has returned the risk by writing procedures for almost anything. From replacing a water filter with the safety checks of a space suit.

In 60 years of space, NASA suffered three fatal injuries in which 17 people died: the Apollo 1 capsule was fired in 1967, the Challenger was destroyed in 1986 and the last Columbia ship exploded in 2003. But none of these accidents is not among astronauts.

Even after the slightest estimates, the International Space Station costs about 350,000 dollars per hour, making astronauts a very expensive resource. For this reason, astronauts start working at 7:30 in the morning and end at 19:00. Even on weekends, they are not free, Saturday is dedicated to job cleaning and on Sundays some works are inevitable.

From 2003 to 2010, 10 US astronauts living on the station had a diary in a research study by Jack Stuster, an anthropologist who studies people living in extreme environments. Anonymous diaries reveal people who are delighted to live in space and occasionally bored and sometimes seriously irritated.

"I laughed alone today reading the procedures," wrote an astronaut. "To replace a bulb, I need safety glasses and a vacuum cleaner with the tip of my finger. This happens if the bulb breaks, but the bulb itself is encapsulated in a plastic box so that even if the bottle breaks Before I start, why do not I have the idea, as NASA does.

"Astronauts never get tired of looking at Earth," wrote an astronaut. He was so captivated that he was looking through the window an orbit of the whole Earth. "I looked at Earth from the point of view of a stranger's visit," wrote another astronaut. "Where can I land and how would I first contact people?"

Writing in the diary shows very clearly that six months is a long time - without families and without friends, without fresh food, without feeling wind, rain or pleasure of gravity. A long time when you work in the workplace. Records also show that keeping a journal significantly improves the morale of an astronaut.

During short missions, the enthusiasm of being in space is not diminishing. However, on the station, NASA had to be more attentive to the astronauts' morale, because it is a lot of work and most of the time uninteresting. The International Space Station has a phone call from where astronauts can call who they want. Families of astronauts receive tablets for private video conferencing. And astronauts have private conversations with NASA psychologists every two weeks.

In space, says Mike Hopkins, "everything is new, from hygiene, supper to rest, everything is completely different." This is the opinion of someone who was trained every day two years before launch.

"How to live in zero gravity?" Asks Sandra Magnus, who participated in 3 space flights, including 130 days on the station. "It's very fun," she says, then laughs. "I learned to transport my things with my knees, so I had my hands to move. Gravity is an indispensable tool and I appreciate it only when you have to live without it, drawers on the floor, in space, all are everywhere, each object you use must be caught or floating. "Astronauts spend enough time looking for lost gear. "Tracking things can be eaten all day," says astronomer Mike Fincke.

Sandra Magnus liked to cook for college at the train station, finding new dishes from the ingredients sent by NASA. "It takes a few hours to cook so that we can only cook at the end of the week," says Sandra. "Think about one thing: when you cook, you'll throw the debris into the garbage, the station can not, we used a piece of adhesive tape, but even so, the cooking lasted a lot longer."

Mike Fincke spent more time in space than any other American - 381 days in 3 missions. He made nine exits in space, cumulating a total of 48 hours. Mike studied at MIT and Standford and graduated from the US Pilot School before becoming an astronaut.

"A little push with your thumb and you'll be halfway to the station. It's like you're a Superman," says Mike Fincke.

Under zero gravity, all body fluids are also in zero gravity, so astronauts often have a sense of disorder.

Lack of seriousness causes nausea. 54-year-old Leroy Chiao retired after four flights and described what had happened just before leaving the chair. "Your inner ear thinks you are a rebel, the feeling of balance is everywhere ... Meanwhile, your eyes tell you that you do not twist, do not stand in a vertical position, do not bother, that's why some astronauts feel nautical "After the first few days - very difficult for astronauts - they learn to ignore the internal ear panic and" space disease "disappears.

Astronauts lose bone mass, but they regenerate partially in response to the exercises they do every day. Without gravity, the rate at which cells return slows down and thin bones weaken.

Mark Guilliams is NASA's head coach for NASA astronauts. He works at the Johnson Center in Houston, where he has over 40 active US astronauts.

"Life in zero gravity is the equivalent of a prolonged stay in a hospital," says Guilliams. "You lose your muscles, you lose the volume of blood".

"Without gravity, sweating is not pleasant: on the ground, when riding a bicycle, sweating is done on your side and the station hits you in your arms, on your head, around your eyes.

Attention to fitness is equally important in terms of science and the future, as it is about keeping an astronaut in a healthy state. NASA is worried about two things: recovery time when astronauts return home and retain their skills for two or more years while returning to Mars. If astronauts lose 10% of cardio, how much does it have on the station? "Not too much," says Guilliams, "but if we go to Mars, the loss could be critical."

We still do not understand all the implications of a long flight. "Five years ago," says John Charles, a NASA researcher in the Human Research Program, "I had an astronaut on the station saying suddenly," hey, my site has changed. They are 3 months old and can not read the checklists anymore. "It seems Charles says all the moving fluid increases the intracranial pressure. The fluid pushes the balloon back and flattens it," says Charles.

Today, the station is equipped with adjustable glasses so astronauts who do not normally wear glasses use them if they need them. For those who already wear glasses, additional glasses are prescribed with stronger prescriptions.

Astronauts need a good vision and vision damage during space flight is not a minor issue. NASA knew about this issue a few decades ago. "We also saw this on Skylab," the first space station in the US, which housed several astronauts for 1-3 months between 1973-1974. Bone masses, muscle mass, blood volume, etc. they return to normal for the most part. But astronaut's eyes do not recover completely. Even doctors do not know exactly what would happen during a mission four or five times longer than today.

The station is a permanent outpost, but it is not independent. Those at the Control Center do not wake the astronauts from sleep and the control of the station is grounded.

Every day begins and ends with a planning conference where astronauts check with all five control centers in the world the programming grids, maintenance or what will be done the next day. NASA has a second unit in Huntsville, Alabama, which deals with scientific research. Moscow has a mission control center for half of the Russian station and the European Space Agency and the Japanese Space Agency have their own control centers.

Although the station flies to 27,600 km/h (10 times faster than a bullet), it still can not escape the daily sessions.

Even though the astronauts live and work at the station, they do not control the flight. The Houston and Moscow centers are responsible for piloting the station where the mission control center monitors the position and adjusts it as needed using gyroscopes and propulsion engines. The Mission Control Center also monitors all onboard systems - electrical, life support, IT, communications. It takes about 1,000 people on Earth for each astronaut in orbit. Even after the astronauts have finished their work day, those on Earth continue to work 24 hours a day.

Life on the station is managed at one minute. When an astronaut clicks on a time cell, it expands and shows the steps necessary to perform the specific task.

In its way, the program can be a source of freedom, but it can also be frustrating. Scientific experiments, maintenance tasks, the arrival and departure of the food vehicle, everything is fixed from the ground. Each astronaut's program has a red line that slowly moves to the laptop screen, from left to right, showing the current time and what to do at that time.

Life in space is so complicated that 50 employees are needed only to build the program for US astronauts in orbit. From provocative and entertaining intellectual tasks (conducting research with ground scientists) to boring ones (recording serial numbers of objects in the trash before sending them into the atmosphere) are part of the daily work of an astronaut in the space bar.

The costume is not less than 50kg and on Earth, during simulations, 3-4 people are needed. The station is just one. The procedure to reach space is not less than 400 steps.

Extravehicular activity is, for almost all astronauts, the greatest challenge. Outside the station, you are an independent astronomical body that orbits 27,600 km/h.

Extravehicular activity is dangerous and shows how dangerous space can be.

A single connector could lead to disaster.

Therefore, space units are simulated on Earth in a basin and are carefully planned.

NASA initially promised that space shuttles would fly at least 25 times a year. In fact, the transfer program had a duration of five flights a year. In the peak year, in 1985, there were 5 flights. President Ronald Reagan, in his 1984 statement, asked NASA to permanently create and rent a space station that he predicted would allow him to join scientific research, communications and drugs that could only be built in space. NASA's original vision for the station was as ambitious as Apollo. The station would have seven main functions: to be a research laboratory, a production unit, an observatory, a space transport center, a satellite repair station, a space shuttle assembly station and a stationary base for missions in the system solar.

30 years later, only one of these functions remained: The research lab. And despite Reagan's aspirations, nobody is using today materials or drugs invented on the station.

At present, about 40% of the station's commercial research capacity is not used - most likely because some companies do not know it is available.

NASA has always said that understanding how to live and work in space for long periods of time has been a key objective of the International Space Station. But, from the White House, it may seem expensive this race around the Earth, because the mission costs about 8 million dollars a day.

Space makes us anxious. We are impatient that things are going well as if space flight should be infallible as a flight to London. And we look forward to a return on investment.

We fly in space because of human ambition, because nothing gives us more resistance than trying to do what we have not done before. And it flies in space because space is the eighth continent.

We may eventually need asteroid or lunar resources, depending on how we manage the resources we have here on Earth.

Eventually, we should become a species that will conquer other planets, whether we are or destroy or that it will be destroyed.

If the first step, ie the space station of the soil (which verifies the living conditions in space), the next step would be a colony on the Moon followed by another on Mars.

The moon has fascinated mankind for a long time, so we should only colonize it if it had terrestrial bases on it, so we could begin to expand humanity into the universe, obviously at first in our solar system.

There is no point in going any further than if we were able to successfully complete all the necessary steps.

The moon is of interest in many respects and a major concern is the ability to communicate people from different places in space, with the ability to place simultaneously on multiple planets and satellites, which would allow the first immediate expansion of humans, weekly natural satellites, one-month stops, space stations with stops per month, space museums per month, military and strategic bases of our natural satellite, Earth's energy reserve system, some possible terrestrial attacks, including satellites, meteorites, asteroids, comets.

Brown University researchers have concluded that there are more water reserves in our natural satellite formations after analyzing multiple sets of data from the data collected by Chandrayaan-1, the probe that orbits the Moon, reconsidering the data collected by Apollo missions.

Pyroclastic re-analysis (rocks from volcanic activity) showed that they contain traces of water. Also, this water is formed in this environment, contrary to another theory claiming that the water would have come from outside the volcanic environment, writes Science Alert.

The team wrote in the study that "the presence of water in pyroclastic deposits reinforces the theory that the moon cloak is an important reservoir of water."

Ralph Milliken, the lead author of this study, argues that "the key question is whether Apollo's evidence is the underlying environmental conditions or just some regions with abnormally large amounts of water."

Russian officials have ordered experiments in the Antarctic to see a future expedition on the Moon, where the Kremlin wants to install a Russian base.

According to TASS, the head of the Institute of Medicine and Biology, Evghenii Ilin, has announced that medical technologies will be tested for future bases on the Moon. The tests will be conducted at Vostok Russian Antarctic Station, where, says Ilian, a simulation of the Moon conditions will be created.

Vostok Station is 1,230 kilometers from the South Pole, at an altitude of 3,500 meters and the average temperature is -55 degrees Celsius. Russian researchers want to build a telemedicine system to create a monthly base of the Kremlin on the Moon.

In November, Moscow's Roscosmos Space Agency announced plans to install a Russian colony on the Earth's natural satellite in 2025, initially speaking about Mars's colonization. Plans for this could be completed next year and analysts believe it could move the "cold war" between Russia and the West into space.

Results and Discussion

Opportunity (called MEC-B, Fig. 9) or MER-1, called Oppy, is a robot engine powered from 2004 until the end of 2018. At NASA, Mars Exploration Rover landed on January 25, 2009, 5111 Meridian Land Measurements landing Planum, recharging solar batteries and hibernation storms. This careful operation allowed Opportunity to exceed its operating plan by 14 years, 46 days (during the Earth), 55 times the projected lifespan. Until June 10, 2018, when he first contacted NASA, Rover traveled at a distance of 45.16 kilometers.

The most important missions included the initial 90-mile mission, finding extramarital meteorites such as the Rock of Heat Shield and over two years exploring and studying Crater Victoria. Rover survived the moderate dust storms and in 2011 reached the Endeavor crater, which was described as the "second place to land." The Opportunity mission is considered one of NASA's most successful adventures.

Due to the 2018 planetary storm on Mars, Opportunity stopped communicating on June 10 and went into hibernation on June 12, 2018. We hoped to resume once the weather was removed but did not suggest catastrophic failures or dust-covered panels.

NASA hopes to renew contact with the rover, citing a windy period that could potentially clean the solar panels. On February 13, 2019, NASA officials said the Opportunity mission was complete after the spacecraft did not respond to over 1,000 signals sent from August 2018.

Collectively, the Opportunity and Spirit rovers have been part of the Mars Exploration Rover program of Mars's long-term exploration program. The four main objectives of the Mars Exploration program were to determine whether there is Martian potential (especially if Mars can find recurrent water) to characterize the Mars climate and its geology and then prepare a human mission potential on Mars. Mars Exploration Rovers had to travel on the Martian surface and perform periodic geological analysis to determine whether Mars had ever had water, as well as available mineral types, as well as corroborating data from the Mars Reconnaissance Orbiter. Spirit and opportunities were launched one month apart, between June 10 and July 7, 2003, both conducted between January and March 2004. Both rovers were designed with a life span of 90 soils (92 days), but each it took much longer. Spirit's mission lasted 20 times more than estimated life and his mission was declared ended on May 25, 2011, after being blocked on soft ground and consuming reserves of power trying to get rid of it. This opportunity lasted 55 times longer than the planned 90-year duration, operating for 5498 days from landing to the end of the mission. An archive of weekly updates on rover status can be found in the Opportunities Update Archive.

From the initial landing, from a chance, into an impact crater in the middle of a flat field, Opportunity has successfully investigated soil and stone samples and made panoramic landscapes. His sample allowed NASA scientists to make assumptions about the presence of hematite and the presence of water on the surface of Mars. Later, she was trained to travel to Mars to investigate another crater, Crater Endurance, which she investigated from June to December 2004. Later, Opportunity examined the impact site of the heat shield and discovered a Meteorite Intact, known as Rock Shield Heat on Mars.

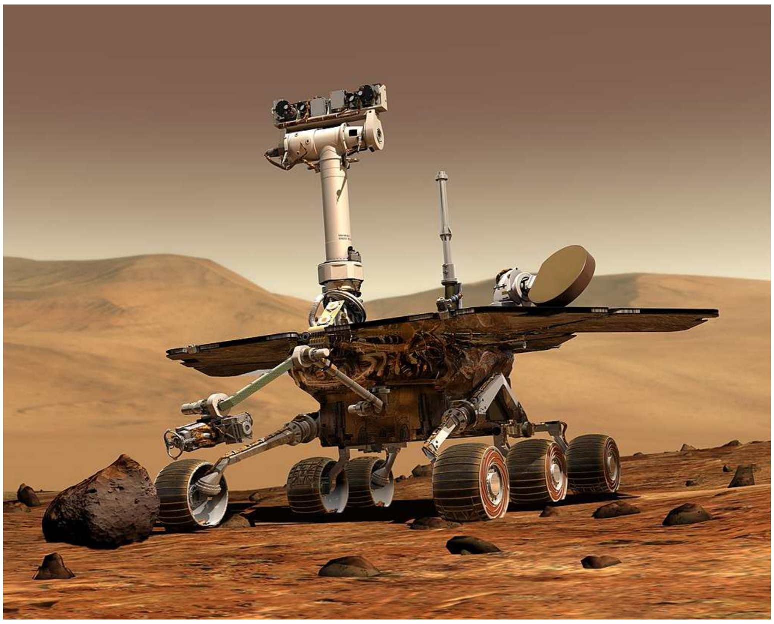

Fig. 9: NASA Mars Exploration Rover on the surface of Mars; Rovers Opportunity

From the end of April until the beginning of June 2005, Opportunity was placed dangerously in a sandy dune with several wheels buried in the sand. Within a six-week period, Earth-based physical simulations were performed to decide how to remove the rover from its position without risking its permanent immobilization. Successful maneuvering a few centimeters at a time launched the rover, who resumed his travels.

The opportunity was directed southward to the Erebus crater, a large, superficial, partly buried crater and a stop on the road south to Crater Victoria between October 2005 and March 2006. He had some mechanical problems with his robotic arm.

At the end of September 2006, Opportunity reached the Victoria Crater and explored along the rim in a clockwise direction. In June 2007 he returned to Duck Bay, his original point of arrival; in September 2007 he entered the crater to begin a detailed study. In August 2008, Opportunity left Crater Victoria for Crater Endeavor, who arrived on August 9, 2011.

Here, on the edge of the Endeavor crater, the rover moved around a geographic feature called Cape York. Mars Reconnaissance Orbiter detected the fluosilicate there and the rover analyzed the stones using the tools to check the field sight. This structure was analyzed in depth until the summer of 2013. In May 2013, the rover headed south to a hill called Solander Point.

The total opening of opportunities until June 10, 2018 (land 5111) was 45.16 km (28.06 mi), while the dust factor was 10.8. Starting in January 2013, the solar matrix dust factor (one of the determinants of solar energy production) ranged from 0.467 to 5 December 2013 (3507 soil) at a relatively low level of 0.964 on May 13, 2014. 3662).

In December 2014, NASA reported that Opportunity suffers from "amnesia" events in which rover failed to write data, e.g. telemetry information, non-volatile memory. The hardware error was considered to be caused by an age-related malfunction in one of the seven Rover memory banks. As a result, NASA has endeavored to force the rover software to ignore the unsuccessful memory bank; continued the improvement of the events, which led to the vehicle's reset. In this context, ground 4027 (May 23, 2015), the rover was configured to operate in RAM mode only by avoiding non-volatile storage for storage.

At the beginning of June 2018, there was a planetary dust storm and in a few days, the solar panels of the rover did not generate enough power to maintain communication with the last contact on June 10, 2018. NASA said it did not expect to resume communication until the storm disappeared, but the silent rover even after the storm ended in early October, suggesting either a catastrophic malfunction or a layer of dust covering the solar panels. The team remained confident that a windy period between November 2018 and January 2019 could remove the dust from its solar panels, as it did before. The wind was detected near January 8 and on January 26, the mission team announced a plan to launch a new set of rover commands if the radio receiver failed.

On February 12, 2019, previous members and mission team members gathered in the JPL Space Operations Unit to track final orders sent to Opportunity through the 70-meter Goldstone Deep Space community in California. After 25 minutes of transmission of the last four sets of orders, the rover communication attempts were handed over to Canberra, Australia.

More than 835 recovery orders were transmitted from the signal loss in June 2018 to the end of January 2019, with over 1000 recovery orders filed before 13 February 2019. The SAA officials held a press conference on 13 February to declare the official termination of the mission. NASA Associate Administrator Thomas Zurbuchen said: "Therefore, I am here with a deep sense of appreciation and gratitude that I declare that the mission of opportunity is complete." While NASA attempted to contact the rover, the most recent data sent was "I Want to See You" by Billie Holiday.

The final announcement of the rover came on June 10, 2018 (land 5111) of the Persian Valley and indicated the solar energy of 22 Wh and the largest atmospheric opacity measured on Mars: 10.8.

Spirit and Opportunity are double robots, each six-wheeler, sun, 1.5 meters tall, 2.3 meters (7.5 meters) wide and 1.6 meters long and weighing 180 kilograms. Six wheels on a bogie system allow mobility. Each wheel has its own engine, the vehicle is facing the front and rear and has been designed to operate safely with a tilt of up to 30 degrees. The maximum speed is 5 centimeters per second (2.0 in / s), although the average speed was about one-fifth (0.89 centimeters per second (0.35 in / s)). Both Spirit and Opportunity have pieces of metal fallen by the World Trade Center, which they turned into shields to protect cables from drilling mechanisms.

Solar panels generate about 140 watts for up to fourteen hours on the ground, while rechargeable lithium-ion batteries store energy for use at night. The Opportunity board computer uses a 20 MHz RAD6000 processor with 128 MB of DRAM, 3 MB of EEPROM and 256 MB of flash memory. The operating temperature of the rover varies from -40 to + 40°C (-40 to 104°F) and the radioisotope heaters offer a base heating level assisted by electric heaters when required. A gold film and a layer of silica gel ensure isolation.

Communications depend on a low-gain omnidirectional antenna that communicates at a low data rate and a high-speed antenna, both in direct contact with the Earth. A low-gain antenna is also used to transmit data to spacecraft orbiting Mars.

Fixed science/engineering tools included: Panoramic Camera (Pancam) - examines the texture, color, mineralogy and structure of the local territory (Fig. 10).

Navigation Camera (Navcam) - monochrome with a higher field of view, but with lower resolution for navigation and driving.

Mini-TES (Mini - TES) - Identifies promising rocks and soils for deeper examination and determines the processes that have formed them.

Hazcams, two B & W cameras with a 120-degree viewing field that provide extra data about the rover surroundings.

The rover arm has the following tools:

Mössbauer (MB) Spectrometer MIMOS II - used for the thorough investigation of iron and soil mineralogy.

X-ray Alpha Spectrometer (APXS) - Detailed analysis of the abundance of rock and soils.

Magnets - for collecting magnetic particles of dust

Microscope (MI) - Get high-resolution images of stone and soil.

Stone Abrasion Tool (RAT) - Exposes fresh materials for examination on the instrument panel.

Rooms produce 1024 pixels with 1024 pixels, data is compressed with ICER, stored and transmitted later.

Rover's name was chosen through a NASA sponsored essay contest.

The opportunity was "driven" by several operators, along with his mission, including the JPL Vandi Verma robot, who also co-wrote the PLEXIL command language used in his software.

Rover uses a combination of solar cells and a rechargeable chemical battery. This rover class has two rechargeable lithium batteries, each consisting of 8 cells with a capacity of 8 amperes. At the beginning of the mission, solar panels could provide up to about 900 hours of operation (Wh) to recharge the battery and the earth's power supply, but this could vary depending on different factors. In the Eagle Crater, the cells produce approximately 840 Wh, but soil 319 in December 2004 dropped to 730 Wh.

As on Earth, Mars has seasonal variations that reduce the sun in the winter. However, since the Martian year is longer than Earth's, the seasons rotate about once every two years on Earth. By 2016, MER-B suffered seven martial winters, during which time power drops, which means that the rover avoids carrying out activities that use a lot of power. During its first winter power levels fell below 300 Wh a day for two months, but some winters later were not so bad.

Another factor that can reduce the power received is dust in the atmosphere, especially dust storms. Dust storms occurred quite frequently when Mars is closest to the Sun. Global dust storms in 2007 reduced power levels for Opportunity and Spirit so much that they could only be executed for a few minutes every day. Due to the 2018 dust storms on Mars, Opportunity went into hibernation on June 12 but remained silent after the storm disappeared in early October.

Curiosity is a car-sized rover designed to explore the crater Gale on Mars as part of NASA's Mars Science Laboratory mission (MSL; Fig. 11).

Curiosity was launched from Cape Canaveral on November 26, 2011, at 15:02 UTC and landed on Aeolis Palus in Gale on Mars on August 6, 2012, at 5:17 UTC.

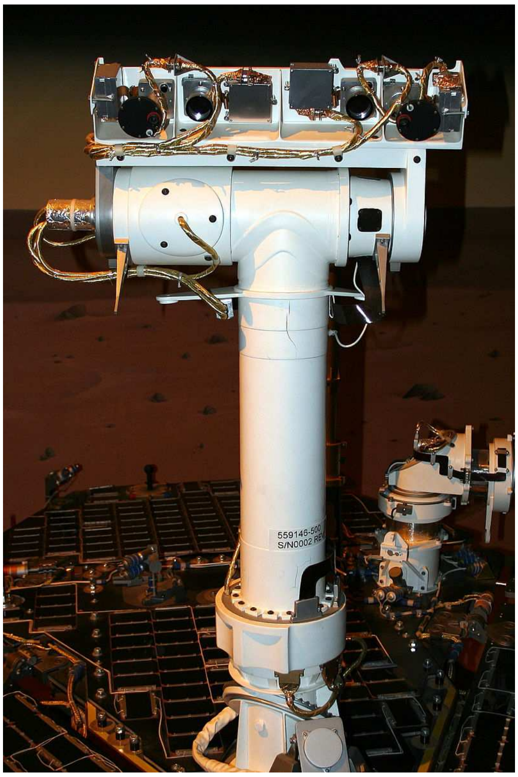

Fig. 10: PanCam Mast Assembly (PMA) aboard Mars Exploration Rovers, from full-scale reproduction on display at the Virginia Air and Space Center

Fig. 11: A self-portrait of NASA's Curiosity Mars rover

The Bradbury Landing Point was less than 2.4 km (1.5 mi) from the rover's target center after a 560-million-mile journey. The objectives of the rover include an investigation into Martian climate and geology; assessing whether the site selected in Gale has ever provided environmentally friendly environmental conditions for microbial life, including investigating the role of water; and studies on planetary habitats in preparation for human exploration.

In December 2012, the Curiosity mission of two years was extended indefinitely and on August 5, 2017, NASA celebrated the fifth anniversary of Cavalry Civic Landing. The Rover is still operational and, from April 16, 2019, Curiosity was on Mars for 2,379 lands (2444 days) since landing on August 6, 2012.

The curiosity design serves as a basis for planning the Mars 2020 plan that will carry various scientific instruments.

The general analysis strategy begins with high-resolution cameras looking for features of interest. If a particular surface is of interest, Curiosity can vaporize a small portion of it with an infrared laser and examine the signature of the resulting spectrum to interrogate the elemental composition of the rocks. If the signature is interesting, the rover uses his long arm to rotate on a microscope and an X-ray spectrometer to take a closer look. If the specimen warrants further analysis, curiosity can be destroyed and can provide a sample of powder either from the SAM analysis laboratories or from the Chemin analytical laboratories in the rover. Mast Cam, Mars Imaging for Manual Objectives (MAHLI) and Mars Descent Imager (MARDI) were developed by Malin Space Science Systems and all have common design components such as CCD 1600 × 1200 and Bayer Bayer RGB image processing cartridges (Fig. 12).

A SpaceX Falcon 9 rocket, recovered from its sea after its inaugural flight in 2016, was re-launched from Florida on Thursday in the world's first launch of a re-used orbital vehicle. SpaceX then succeeded in a new performance, as the spacecraft made a controlled, steady descent, placing it successfully on an ocean platform, informs Reuters, quoted by News.ro.

This double success - an unprecedented achievement in space history - to re-launch a missile already used, followed by a new vehicle recovery, was praised by billionaire Elon Musk, the founder of SpaceX, who considers it a revolutionary step towards reducing costs launching and shortening the time span between space launches.

"This is a huge day. My mind is overwhelmed," Elon Musk told US reporters after launching the rocket.

The SpaceX company took 15 years to prove that a rocket - which is typically abandoned in the ocean after a space flight - can be recovered and reused.

SpaceX CEO said his next goal is to prepare missiles to be launched once more within 24 hours and said that this could be done before the end of this year.

"There is potential for a 100 times reduction in the cost of access to space." If we can do that, then mankind can become a civilization that travels through space and gets there upstairs amongst the stars. I want for the future, "said Elon Musk.

The Falcon 9 launcher, which flew for the first time in orbit in April 2016, took off this time from the Kennedy Space Center on Thursday at 18.27 (22.27 GMT) local time with the mission to place a communications satellite on the orbit for the company Luxembourg SES.

The main launcher module then separated from the rest of the rocket and returned to Terra, realizing - for the second time - a controlled, steady descent on an Atlantic platform.

The second floor of the launcher, which is not recoverable, continued its flight and placed on the orbit an SES - 10 satellite that will provide television and communications services for Latin America.

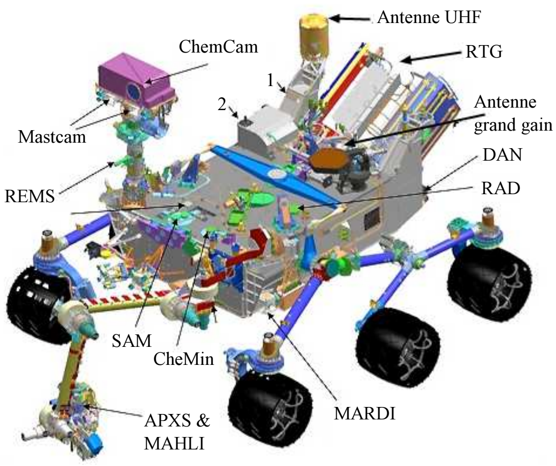

Fig. 12: Curiosity Mars rover Instrument location diagram

"We have made a little bit of history today," said Martin Halliwell, SES Technology Director, who joined Elon Musk at Thursday's press conference, "We have opened the door to a completely new era in space flight history.

SpaceX first managed to bring Terra to an orbital missile after launch in December 2015 and has since repeated this performance nine times. The Falcon 9 launcher, launched on Thursday in the 33rd space mission of the US company, was the first SpaceX vehicle to be controlled in 2016.

By re-using its missiles, SpaceX wants to get a 30% reduction in launch costs. The cost of launching a Falcon 9 rocket is $ 62 million.

But the savings will not be reflected on all SpaceX customers and some of them have been waiting for the release of Thursday before accepting to place their products on board reusable rockets, said Elon Musk.

SpaceX has spent at least $ 1 billion to develop the technology that allows the fixed rockets to come back and relaunch later and could recover its investment next year.

According to Reuters, SpaceX missiles may be capable of being launched 10 times without being modified and 100 times after some refurbishments.

The rocket that came back on Terra on Thursday will be donated and exposed to the Cape Canaveral Spaceport.

SpaceX is also working to develop a space vehicle that will be able to carry passengers on orbit and two future space tourists - whose identities have not yet been unveiled - have already signed contracts for a flight around the moon.

SpaceX's long-term objective, already announced by Elon Musk, is to establish a human colony on Mars and to provide space transport services between Terra and Mars.

NASA has come to the conclusion that there is water on the Red Planet. And further on? As ever since the primitive era communities formed near water sources, NASA has projects to create human colonies on Mars. Can the future Martian colonists and unknown forms of life meet? If Hollywood came out on the market with a film resuming NASA's ideas about colonizing the Red Planet, the reality of such a challenge is still to be expected. And that's because a lot of obstacles arise in the way of imagination.

This is also underlined by the US Space Agency in a 36-page document that mentions the dangers of such an adventure, but also the fact that obstacles can be defeated. Obviously, NASA does not mention anything about either the precise date of such a human expedition on Mars or the cost of such a first mission. In general, the first mission on Mars could take place in 2030, that is, over 15 years, which is hard to believe. To deepen the ambiguity, NASA chief Charles Bolde was also proving optimistic when he underlined in a press release that "The Agency has never been so close to sending US astronauts to Mars" (?), Insisting on the importance of cooperation with international partners and private companies for the success of the project. In other words, American success with the rest of the world.

What are the dangers?

Life in space, that is, during a human journey to Mars, means accepting risks, but their face is worthwhile in the end, says the NASA document, adding that "the goal is achievable." Dangers are actually numerous along the Mars periplus where astronauts should spend three years in space. From cosmic rays that greatly increase cancer risk to lack of gravity for so long, that would lead to loss of bone density and muscle mass, not to mention weakening the immune system, as the NASA document says.

Problems could be overcome, says the same document, by NASA's realization of new space combines. A major obstacle is the space ship. How big can it be with what energy would be propelled to Mars and back? NASA should invent a new propulsion system for the tons of a ship that would reach Mars, which, according to some specialists, is very complicated. The heaviest device that NASA sent to the Red Planet is the Curiosity robot whose mass did not exceed a ton. In addition, there is a need for a habitat and a vehicle to take off from Mars to return to Earth.

To overcome these difficulties with a human flight to Mars, a strategy is needed in several stages, NASA writes. One would be simpler, it is about astronauts training for longs space travel, which will be done on the International Space Station (SSI), where two astronauts, a Russian and an American will experience for one year the effects of long staying in space human body. NASA and its partners are testing SSIs for cutting-edge space-based technologies such as survival and communications. But the Martian pioneers will need a more draconic workout. It will succeed in the second phase of the strategy, namely in a series of missions around the Moon, somewhere in the years 2020.

Everyone is expecting such preparatory missions, at least to put an end to the suspicion of Apollo missions. Many consider, by analyzing NASA's official photos, that no American astronaut arrived on the moon, the main reasons for weather technology that did not allow such a mission. Everything that could be accomplished at the end of the sixth decade of the last century was a circumcision mission. Aselenization and all the rest, say, skeptics, were just studio productions, how earthly it is! The proof is that NASA has a big problem arriving not on the moon, but on the circumnavigation! What would have succeeded in the 60-70s is now, after nearly 50 years, a real challenge! And then phantasmagoric projects appear.

NASA has a project to find an asteroid quite close to the Earth that would drag it to put it in a lunar orbit after placing it on the asteroid and an automatic space probe! This mission is actually aimed at testing an electric propulsion system using solar energy, which, after NASA, is essential to transporting a few tons of load to Mars. The US Agency's officers imagine that the astronauts will visit the asteroid in the lunar orbit by about 2025, taken there by a four-space Space Orion System (SLS) space launch, the next super-powerful missile.

The problem is that in ten years, NASA should also have an asteroid, but also a super strong rocket plus a four-seater space capsule! Orion's first flight, without astronauts aboard, would be over three years and in 2020 with astronauts, dreams hard to believe. As proof, independent experts and some members of the American Congress, they are not impressed by the pharaonic projects of the Agency, nor by the recently published document.

Lamar Smith, the chair of the Science and Space Committee, noted that "NASA's plan does not contain information about the budget or the timetable of the missions," the document is just a "collection of beautiful photos and words that cannot get us on Mars ". John Logsdon, a former director of the Space Policies Institute in Washington, believes NASA has come up with a fast-paced document "in response to criticism that NASA has no plans for Mars."

Finally, John Rummel, a researcher at the SETI Institute (who is looking for five-decade extraterrestrial beings), estimates NASA's "serious loopholes", one of which is that it does not explain how astronauts will produce space food to survive on the journey to Mars. It is clear: a document cannot lead us to Mars, the obstacles are big and no one says precisely that they can be technologically outdated. Until then only simple projects on paper remain.

When it comes to exploring and conquering cosmic space, we all become specialists and we think and say we have to be much more advanced. Still, we think that such an enterprise is not at all simple. Besides the huge costs, it is difficult to raise so much money very quickly, there are many other problems. We need, for example, the find for specialized equipment, automation, specialized robots to help us with various cosmic operations and all this has not existed until now and if today they exist, it helps us, it is also because with the time we have advanced and produced and adapted to our needs. It was not easy or simple. All necessary training lasted a lot. Let's just think about the necessary electronics that 20-30 years ago did not exist and which has advanced a lot especially in the last 50 years and now with the software automation and robotics progress spectacularly and can assist us for such a big enterprise such as that of conquering space.

It took decades to first explore the space around our planet to figure out what can happen when we leave the Earth's atmosphere and especially when we are wearing all the dangerous radiation from the cosmos, the lack of gravity and other phenomena the exposure of the human organism outside our land atmosphere. It is difficult to eat in a state of impenetrability because it is like when you come to vomit and all come back from the stomach to the outside, the food and liquids are hard to convince to go from the mouth to the stomach and further towards the intestines when there is no gravity.

About psychological effects. Physiological changes occur in the body, an effect of loss of our ability to use our vital senses, sight, hearing ... Sleep is more difficult sometimes in extraterrestrial conditions and without obvious necessities, the human body is physically stressed permanently, when it breathes, other than the normal air on Earth, that is, every second, when eating or drinking, when it is necessary to eliminate the natural waste from the body, when the body wants to sleep, to rest on a bed, but what is that rest, that is to stretch a little horizontally where there is no upper and lower left or right, when everything goes wrong in any direction and you have to do something to have support, maybe you can be real rest, like at home on Terra.

Radiation is extremely dangerous outside the terrestrial atmosphere and protective equipment is cumbersome and quite tiring. Let's imagine how hard it is in the winter to equip our heavy and heavy and heavy clothing with the boots, the summer when we put on a blouse and a light trouser and we quickly get out of the house with some light and comfortable shoes. That's how it is in the cosmos, where it is always the winter in itself and figuratively, it is always cold but in addition it is necessary to equip ourselves well and hard to always anchor something, that is to find a stable land at all times in the absence of home gravity, landmarks disappear altogether.

It took all kinds of ships and robots to explore the cosmic space first, powerful telescopes to see far away, specialized ships to transport us, robots and equipment and so on, have done in time not suddenly and they took a long time so that we can begin more and more serious projects of conquering space. Today we have everything we need to get on the expedition and we have already sent messengers to search before us the planets we want to colonize. The closest and natural is our neighbor Mars, but a base and to our natural Moon is also necessary.

Conclusion

Life in space is so complicated that 50 employees are needed only to build the program for US astronauts in orbit.

From provocative and entertaining intellectual tasks (conducting research with ground scientists) to boring ones (recording serial numbers of objects in the trash before sending them into the atmosphere) are part of the daily work of an astronaut in the space bar.

However, it is time to say that the role of the robot in the future is altogether another, namely, to help us conquer the cosmic space to expand ourselves as a race in the whole universe in which we are now. In fact, this is the robot's humanitarian role and, in the future, it can only be developed and prepared for this purpose. Exploratory robots are robots that operate in hard-to-reach and dangerous, telegraphic or partially autonomous locations. They can work, for example, in a region in military conflict, on the Moon or on Mars.

The opportunity was "driven" by several operators, along with his mission, including the JPL Vandi Verma robot, who also co-wrote the PLEXIL command language used in his software.

Rover uses a combination of solar cells and a rechargeable chemical battery. This rover class has two rechargeable lithium batteries, each consisting of 8 cells with a capacity of 8 amperes.

At the beginning of the mission, solar panels could provide up to about 900 hours of operation (Wh) to recharge the battery and the earth's power supply, but this could vary depending on different factors. In the Eagle Crater, the cells produce approximately 840 Wh, but soil 319 in December 2004 dropped to 730 Wh.

As on Earth, Mars has seasonal variations that reduce the sun in the winter. However, since the Martian year is longer than Earth's, the seasons rotate about once every two years on Earth.

By 2016, MER-B suffered seven martial winters, during which time the power drops, which means that the rover avoids carrying out activities that use much power. During its first winter power levels fell below 300 Wh a day for two months, but some winters later were not so bad.

Another factor that can reduce the power received is dust in the atmosphere, especially dust storms.

Dust storms occurred quite frequently when Mars is closest to the Sun. Global dust storms in 2007 reduced power levels for Opportunity and Spirit so much that they could only be executed for a few minutes every day. Due to the dust storms on Mars in 2018, Opportunity went into hibernation on June 12 but stayed silent after the storm broke out in early October.

Curiosity is a small machine designed to explore the Mars Gale Crater within the NASA mission, Mars Science Laboratory (MSL, Fig. 11).

Curiosity was launched from Cape Canaveral on November 26, 2011, at 15:02 UTC and landed on Aeolis Palus in Gale on Mars on August 6, 2012, at 5:17 UTC. The Bradbury Landing Point was less than 2.4 km (1.5 mi) from the rover's target center after a 560-million-mile journey.

The objectives of the rover include an investigation into Martian climate and geology; assessing whether the site selected in Gale has ever provided environmentally friendly environmental conditions for microbial life, including investigating the role of water; and studies on planetary habitats in preparation for human exploration.

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Ethics

This article is original and contains unpublished material. Authors declare that are not ethical issues and no conflict of interest that may arise after the publication of this manuscript.

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