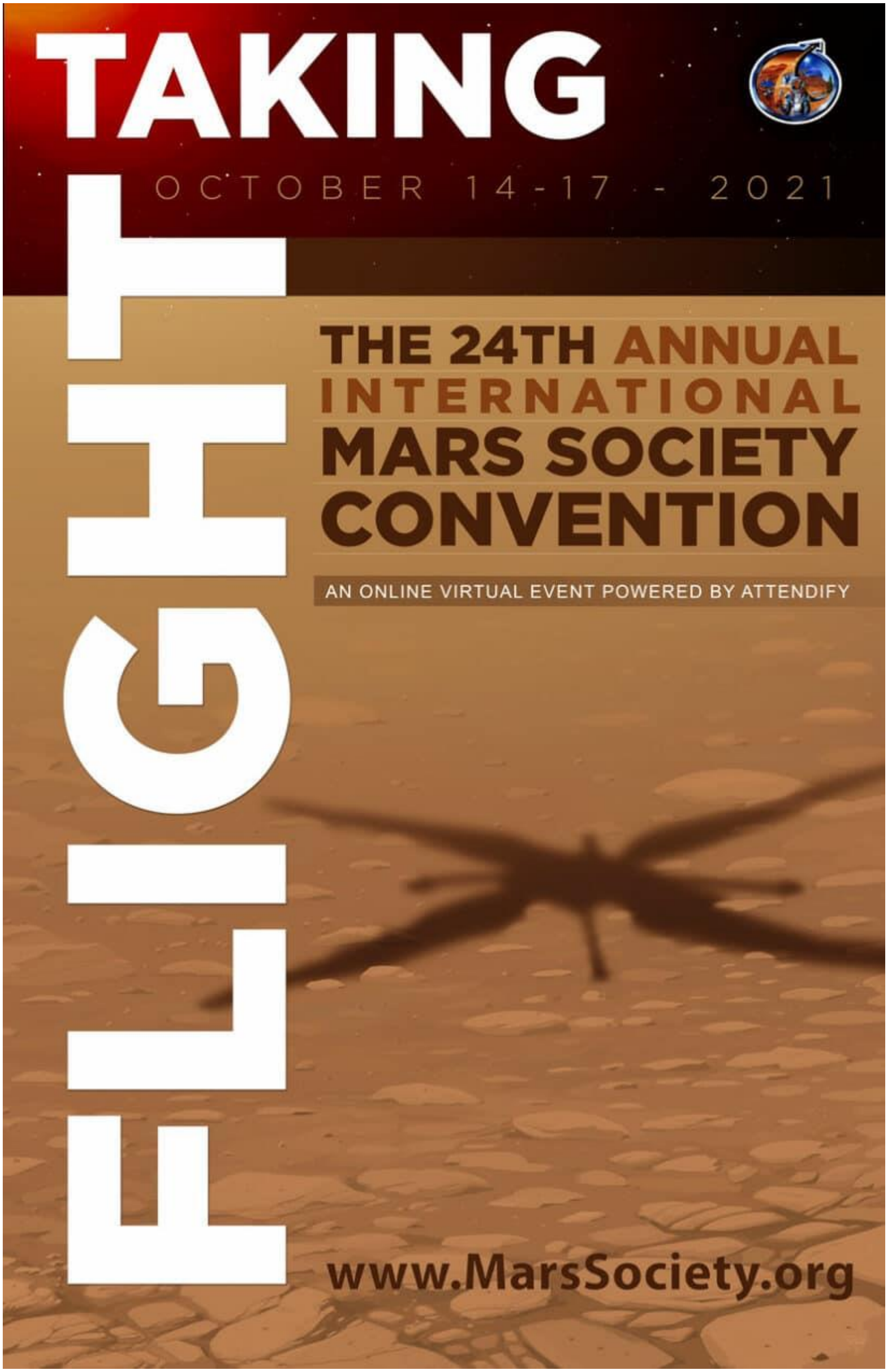

TAKING
FLIGHT
OCTOBER 14-17 - 2021
THE 24TH ANNUAL
INTERNATIONAL
MARS SOCIETY
CONVENTION
AN ONLINE VIRTUAL EVENT POWERED BY ATTENDIFY
www.MarsSociety.org

	Sunday October 17th	
All Times PDT	**Morning Plenaries**	
9:00 AM	Live broadcast with AMADEE-20 Mars Sim Staff (Austria & Israel)	
9:30 AM	Dr. Sara Seager - MIT - Biosignatures in Venusian Atmosphere	
10:00 AM	Barbara Belvisi, CEO, Interstellar Lab - Sustainable Space Settlement	
10:30 AM	Jim Cantrell, Phantom Space - Achieving Economic Space Launch	
11:00 AM	Dr. Setthivoine You, Co-Founder & Chief Scientist, Helicity Space - Fusion Powered Helicity Drive	
11:30 AM	Evan Plant-Weir, Co-Founder, Mars Society Canada, & Senior Blog Writer, The Mars Society	
12:00 PM	Vandi Verma, Chief Engineer, NASA-JPL Rover Robotics Operations - Driving Curiosity & Perseverance	
12:30 PM	Dr. Henrik Hargitai, NASA Ames Researcher - Mapping the Planet Mars	
1:00 PM	José M. Hernández, Former NASA Astronaut & CEO, Tierra Luna Engineering	
1:30 PM	Dr. Elizabeth Turtle, NASA-JPL, Principal Investigator - Titan Dragonfly Mission	
	Afternoon Sessions	
	Tech G	**Mixed B**
2:00 PM	TG-1 Tompkins: Challenges and opportunities for passive, practical agriculture on Mars.	XB-1 Lynov: Self Heating Living Bio Shelter Organism for Mars
2:30 PM	TG-2 Kumar: Conceptual Design of Steam Propelled and Nuclear Powered Interplanetary Transportation Vehicle for Crewed Exploration Missions	XB-2 Trevino et al: Algae on Martian Regolith Simulant as Fertilizer for Life Support
3:00 PM	TG-3 Mathur: Mechanical Energy Storage System - An alternative of batteries on Mars	XB-3 Heinz: Why Art in Space?
3:30 PM	TG-4 Kumar: Autonomous And Sentient Droid (Paldroid) to Assist Space Crews during Long Haul Journey to Mars	XB-4 Reznikov: Smart Impact-Assisted Rapid Construction for Space Colonization
4:00 PM	TG-5 Rajalingam et al: Bio-Inspired Soft Robot for Mars Exploration	XB-5 Holden: Mars Colonist Candidate Selection & Training
4:30 PM	TG-6 Mackenzie/Lutz: Mars Settlement with SpaceX Starships	
5:00 PM	TG-7 Mateus/Esmeral: Modeling of a positioning system for astronauts on Mars	XB-7 Valenzuela et al: Appendicitis Considerations in Long-Term Space Travel
5:30 PM	TG-8 Abhang et al: Autonomous Geomatics for Mars Exploration and Settlement	XB-8 Sobocinski: Terraforming Mars? Games & Their Positive Impact on the Perception of Space Exploration

6:00 PM	TG-9 Prabakar et al: Astronaut Assisted Mobility Surface Explorer (AAMSE) for Mars	Mars Society Chapters Council All representatives from new/prospective and existing chapters are welcome
6:30 PM	TG-10 Rezende: Mars Farming Viability	
	Break (7pm - 7:30pm)	
7:30 PM	**Sunday Evening Program**	
	Kolemann Lutz, Bruce MacKenzie, Jekan Thenga - Mars University	
8:30 PM	Dr. Robert Zubrin, Founder & President, The Mars Society - Closing Remarks	

2021 Mars Society Convention Schedule

TABLE OF CONTENTS

SUNDAY AFTERNOON SESSIONS

TECH G-1

CHALLENGES AND OPPORTUNITIES FOR PASSIVE, PRACTICAL AGRICULTURE ON MARS

DANIEL TOMPKINS

GROWMARS

Environment of Mars presents challenges and opportunities for agriculture on Mars. Highlights from recent instruction of a 20 hour online course specifically on Mars Agriculture. Plant physiology, genetic engineering, greenhouse design and operations, automation, settlement integration, and rate of expansion to provide for an expanding population were all presented in detail and with Earth based case studies.

TECH G-2

CONCEPTUAL DESIGN OF STEAM PROPELLED AND NUCLEAR POWERED INTERPLANETARY TRANSPORTATION VEHICLE FOR CREWED EXPLORATION MISSIONS

MALAYA KUMAR BISWAL M

RAMESH KUMAR V

GRAHAA SPACE, BANGALORE, INDIA

Human-crewed space exploration missions require a faster, cheaper, and reliable Interplanetary transportation vehicle for revolutionizing the next decade of interplanetary as well as extraplanetary exploration missions. Because faster transit reduces significant challenges such as vulnerable space radiation and exposure to microgravity conditions that readily arise critical and biological health issues. In addition to this, feasible design, mission cost, and propellant mass constraints limit mission planners to limit their human-crewed strategies to Mars. But, there are numerous destinations in our solar system found to have the potential capability for the existence of life. Therefore, to address the space transportation challenge, we have proposed a steam-propelled and nuclear-powered spaceship for human-crewed exploration to Mars and Beyond. The proposed spaceship utilizes, water extraction module to extract water from asteroids, moons, and other interplanetary bodies to fuel, followed by heating of water through controlled nuclear fission to pressurize steam in a propulsion chamber. Upon attaining a certain pressure limit, the steam is allowed to eject via a spaceship nozzle to propel the vehicle. We can maximize the spaceship's delta velocity through controlled steam propulsion for faster transit to various interplanetary destinations. Further, we can find water resources at every interplanetary extremity beyond Mars, and heat production can be enhanced through limited nuclear resources. So, it makes the spaceship renewable and sustainable thereby enabling crew for faster and safer interplanetary transit. Finally, we hope that this kind of spaceship may enable future astronauts to attempt deep space exploration missions in the upcoming decades.

TECH G-3

MECHANICAL ENERGY STORAGE SYSTEM - AN ALTERNATIVE OF BATTERIES ON MARS

DEEPANSHU MATHUR

HABITAT MARTE

Energy generation, utilization, and management is one of the most crucial parts in a long term goal for a sustainable habitation on Mars. Since Mars receive almost half of the solar radiation as compared to Earth and also had no source of continuous power supply like here we have on Earth (Tidal, Thermal, Hydro, Nuclear, and many more) it is very necessary to store the energy generated may it be Solar or wind energy as the source of renewable energy on Mars. So far most of the dependence for storing energy is mostly limited to batteries like Lithium Ion, which in itself is very costly and also has an end of life after around a decade. Also carrying Battery makes it even costlier.

A proposed solution for this energy storage issue could be looking for some alternatives of energy storage systems and for this Mechanical Energy Storage system could be a reliable, cost effective, increased life, and easily scalable model. Dams work on a similar principle of storing mechanical energy as potential energy and converting it into electrical energy whenever needed.

Similar model can be employed for storing energy on Mars by lifting a heavy mass to a height for storing energy in the form of Potential energy and releasing it in a controlled manner will release energy back to the motors in the form of electrical energy. Same motors will lift the heavy mass using solar or wind energy in time of availability of these energies and lowering the mass will generate back electrical energy and can be used by other systems in absence of Sun and wind. This model is easily scalable to the desired amount of energy storage by increasing height or mass or both.

TECH G-4

AUTONOMOUS AND SENTIENT DROID (PALDROID) TO ASSIST SPACE CREWS DURING LONG HAUL JOURNEY TO MARS

RAMESH KUMAR V

MALAYA KUMAR BISWAL M

GRAHAA SPACE

The PalDroid is an autonomous and sentient droid that is intended to assist the space crews with various activities and experiments both during the journey to Moon as well as to the long-haul journey to Mars. The artificially intelligent droid autonomously navigates inside any crewed space capsule and utilizes voice and visual recognition algorithms to take commands, note down basic readings and assist the crew in performing various experiments. It will be well trained using sophisticated machine learning algorithms to interact seamlessly with the crew.

The PalDroid's can be trained specific to the astronaut(s) it is going to reside within the space capsule. This provides a personalized approach to the astronauts and hence it also behaves as a companion to them – ensuring the mental and psychological wellbeing of the crew members. This paper provides details about the physical and algorithmic characteristics of the droid and how it can be trained and commissioned in any crewed space capsule.

The mini droid will have a blend of advanced programmatic features than its predecessors like robonaut, CIMON, kirobo, Int-ball etc., and will be powered by a sentient program that encompasses visual recognition (including facial recognition and video recording capabilities).

TECH G-5

BIO-INSPIRED SOFT ROBOT FOR MARS EXPLORATION

VIVAN RAAJ RAJALINGAM
EVANGELIA GKARAVELA
MANGAI PRABAKAR
RICHAL ABHANG

INTERNATIONAL SPACE UNIVERSITY

The role of robots in aiding exploration in space is currently limited to predictable areas and limited functionalities due to its rigid parts. Soft robots offer a better alternative as they are able to move in many degrees of freedom due to their flexible parts, would consume less power for movements and are more suited to lower gravity and weightlessness environments. In this paper, we report on existing bio-inspired soft robotics research and describe use cases of these technologies for planetary exploration, especially Mars. Based on existing on-going retrieval of research data from the Mars probe, our paper shows that soft robotics offer a viable solution for exploration on the basis of proof-of-concept stage.

TECH G-6

MARS SETTLEMENT WITH SPACEX STARSHIPS

BRUCE MACKENZIE
KOLEMANN LUTZ

Mars Society, Mars Foundation

This is an ongoing effort to design a settlement on Mars, to be built using SpaceX Starships or Blue Origin or similar spacecraft. We will show simple sketches of initial equipment needed before people arrive, and the sequence of deployment. We assume some landing craft will have equipment installed in them, with no plans of returning to Earth. The equipment is for: water, oxygen, fuel, power, and likely plastics, construction materials, greenhouses, habitats, and landing zones.

Suggestions are welcome. Contact BMackenzie@alum.mit.edu

TECH G-7

MODELING OF A POSITIONING SYSTEM FOR ASTRONAUTS ON MARS

HERNÁN DAVID MATEUS JIMÉNEZ
JORGE SOFRONY ESMERAL

UNIVERSIDAD NACIONAL DE COLOMBIA

To date, navigation systems have already been developed for Martian Exploration Rovers (MER), such as Spirit, Opportunity, and Curiosity. Due to the lack of magnetic field, the lack of a Global navigation satellite system (GNSS) and Mars still largely an unknown environment, MERs have used integrated autonomous navigation systems that normally include an inertial navigation system (INS), celestestian navigation systems (CNS) and visual navigation systems (VNS).

On Mars, we can find almost the same natural global positioning references of the Earth, as the stars and the gravity, but there is one that is very important that Mars does not have, the magnetic field. The magnetic field is very important for the yaw angle of positioning systems and for this reason, it is necessary to develop sensors or a combination of sensors to improve the measurement of this angle.

This work presents the development of a navigation sensor for the positioning of Martian explorers based on a servo-visual measurement. This system will be integrated by an inertial navigation system with which it will merge the data obtained for the construction of a position equation. This system will start from the analysis of Martian conditions, such as the lack of magnetic field, which limits the reference in the horizontal plane 'or' angle of yaw.

TECH G-8

AUTONOMOUS GEOMATICS FOR MARS EXPLORATION AND SETTLEMENT

RICHAL ABHANG
EVANGELIA GKARAVELA
MANGAI PRABAKAR
VICTORIA DA POIAN

INTERNATIONAL SPACE UNIVERSITY

The interest in exploration and habitation of Mars is rapidly progressing, yet the surface of the red planet is still not completely mapped. These gaps present challenges and risks for future geological, geochemical, and geophysical investigations on Mars. Safe human settlement can benefit from further study of volcanic activities, caves, and geological features that suggest evidence of water, biological signatures, and suitable environments for human occupation. Technologies like swarm robotics, soft robotics, Unmanned Aerial Vehicles (UAVs), satellite constellations, and rovers could be harnessed to detect various elements and compositions in Martian terrain, soil, and atmosphere. A Mars navigation system and autonomous surveying operations using artificial intelligence (A.I.) will provide a crucial assessment of Martian conditions before establishing a Martian settlement.

TECH G-9

ASTRONAUT ASSISTED MOBILITY SURFACE EXPLORER (AAMSE) FOR MARS

MANGAI PRABAKAR
RICHAL ABHANG
VIVAN RAAJ RAJALINGAM
SASWATI DAS

INTERNATIONAL SPACE UNIVERSITY

Long-duration human spaceflight in zero-G to Mars poses significant health challenges to astronauts including bone loss and risk of spaceflight-induced bone fracture, reduced muscle mass and endurance, spaceflight associated neuro-ocular syndrome (SANS) risk from fluid shifts, impaired extravehicular activity (EVA) performance, and decreased mobility due to altered sensorimotor and neurovestibular functions. Astronauts additionally face higher solar radiation and galactic cosmic rays (GCR) exposure on the Martian surface. Therefore, it can be advantageous for the autonomous Martian crew to explore Martian caves and underground structures such as lava tubes with protection from radiation exposure, minimal Martian regolith dust, and minimal ambient temperature variations. This paper proposes the Astronaut Assisted Mobility Surface Explorer (AAMSE), an inflatable, isoperimetric soft robotics mobility device, as a novel solution to aid physically limited astronauts in traversing off-nominal terrain without expending much physical energy and maintaining balance. Applications for the AAMSE include neuro-muscular impairment compensation, post-injury physical rehabilitation, emergency transport of injured crew members, and accessibility and inclusivity for para-astronauts.

TECH G-10

MARS FARMING VIABILITY

JULIO REZENDE

HABITAT MARTE/ UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE

In this research a methodology was developed to compare the best crops to be managed on Mars. According to methodology proposed, the following steps: 1) Consult the literature to determine production per hectare / meter2; 2) Determine area of production: in the concept of a greenhouse module of 25 m of circumference and presenting 4 shelves. The area of cultivation would be 100 m2. This module will be presenting 100 m2 to produce food; 3) Determine the quantity of wheat production during a year: considering the number of days in the production cycle in the year; 4) Determine the number of calories that the food can generate; 5) Visualize the quantity of calories to feed an astronaut: a regular person on Earth, according to World Health Organization, presents the consumption of 2500 Calories; 6) Determine how many days the 100m2 plant cultivation would supply: considering that astronauts consume an average of 2500 calories each.

The greenhouse would be used to produce other plants. Also it is necessary to have deeper discussions to determine: 1 - Energy, water and oxygen required; 2 - Management demands (working hours); 3 - Losses and risks; 4 - Carbon dioxide management and control; 5 - Height of the plant; 6 - Types/ size of the root and 7 - Recycled sources supply from sanitation system 8 - Protocols/ time schedules to be followed 9 - Effective light systems (natural/artificial) All these steps are important to determine what could be the best crop in terms of efficiency related to nutrients, to be grown/cultivated on Mars. It is recommendable to continue studies considering different crops, also doing experiments in analog habitats.

Mixed B – XB-1

Self-Heating Living Bio Shelter Organism for Mars

ALOSHA LYNOV

BIO VEDA INSTITUTE of ARCOLOGY

My permaculture building skills came in handy at various stages of my life. From digging underground bunkers in preparation for apocalypse and disconnecting from city sewer, to building a flood control barrier and getting my homestead off-the-water grid.

After realizing my fears whilst living in lethally dangerous Johannesburg I relocated to Northern Europe to follow my souls' calling to develop a Self-Heating and Cooling dwelling for most erratic weather patterns.

My name is Alosha Lynov and I am natural builder and curvilinear inventor who has synthesized the greatest minds of the planet in the fields of Regenerative Water treatment Living Machines and eco construction

Since 2007 I've been developing Self Sufficient Habitat that merges nature with interactive play space into one cohesive Living Bio Shelter Organism, that provides food security, oxygen, comfortable temperature as well as EMR protection, whilst being able to withstand the extreme weather without conventional heating or cooling.

Infused with parametric vaults, that work in compression, Wautillarium is fully buriable and thus able to tap the stable geothermal temperature and be protected from snow, hail and wind.

The home I am developing was originally designed for Mars. Its self-heating mechanism utilizes human waste (nitrogen) and carbon as well as laws of physics via thermal mass that heats from sunlight.

I look forward to being part of the team to develop the eco tech for Martian habitat

Mixed B – XB-2

Algae on Martian Regolith Simulant as Fertilizer for Life

DENNIS TERRY TREVINO, ERIN STAMPER

LARRY HARRISON, CHRISTINE ABRBIZO

AMERICAN MILITARY UMIVERSITY

This ongoing, school sponsored study aims to assess if Fe/Perchlorate rich Martian regolith simulant (MRS), MGS-1, as a component of medium in ground-based and orbital-based experiments, will support the growth of protein-dense Limnospira fusiformis. Constant transporting of resources from Earth to beyond low Earth orbit is impractical. Utilizing materials harvested in-situ once on the surface of Mars, will lower logistical constraints in a resource-limited environment. Microalgae should have a major role in maximizing self-sufficiency, supporting the resupply of vital consumables, and other functions on long-duration space travel for a Mars settlement. Hypotheses: H1: Limnospira fusiformis will propagate in its natural genetic sequence under the Habitat grow lights provided in a simulated spaceship environment. H2: Limnospira fusiformis and will be safe for human consumption when utilizing a synthetic Martian Regolith, MGS-1 as trace nutrients in growth medium. H3: We will use the dried spirulina as a substrate for plant propagation. Questions: 1.) What concentration of MGS-1 in algae medium will promote microalgae growth? 2.) What gases and quantities of these gases can be collected and revitalized as a byproduct of algae growth? 3.) How many growth cycles will algae survive in this Martian enriched medium?

Mixed B – XB-3

Why Art in Space?

SABINE HEINZ

SPACE RENAISSANCE INTERNATIONAL

If you think artists are useless, try to spend your quarantine without music, books, poems, movies, paintings, and games. The corona virus has changed our organizational structures worldwide. That also has positive aspects. New technologies have received a boost out of the need to maintain communication structures. This can also be an opportunity. Digitization has entered the world in a new dimension. Elements will find their way into art, be it as artificial intelligence, which is already taking place, or in 3D printing, video technology or other electronic forms. Entirely new art formats will emerge. The new technical possibilities that arise now also influence the content. That could become the art of man venturing into space.

Mixed B – XB-4

Smart Impact-Assisted Rapid Construction for Space Colonization

LEO REZNIKOV

CRYOFO

Space settlement construction conceptual technology uses craters-shelters, pierced by deep impacts of space-velocity construction rockets, or by separate accelerated armor penetrators, or by redirected asteroids.

One of the scenarios of operations (version for Mars) is as follows:

- The target location can be chosen using the extensive Martian database of craters, lava tubes, soils, for example preferably weak fractured grounds in areas of coinciding ancient craters.

- The separation engine launches the penetrator-projectile and transfers kinetic energy from the lander to the penetrator. The separator impulse decelerates the descent vehicle, facilitating a soft landing, and accelerates the penetrator by conserving energy and momentum.

- The Deep-Impact Penetrator pierces the crater of a pre-designed shelter. Prototype-penetrator is a solid kinetic projectile or converted for Space operations Disney military-type bomb or modern Earth-Penetrating Weapon with a warhead for deep blast-excavation.

- After the flip maneuver, the lander enters the dug shaft and strengthens the walls with plume-surface interaction effects of aerodynamic ejection of debris, melting and sintering of the surface layer.

- The parked in the shaft rocket can be used for habitation, production and storage of propellants. Inflatable, 3D-printed, or molded housings can be deployed underground for comfortable habitation. The shaft can be used as launch silo. Pierced craters and shafts can be used as gateways to the planet's surface and combine ancient natural craters, lava tubes, caves and caverns in protected vast spaces for agro-industrial and energy infrastructure, in-situ resource utilization, supply and accumulation of geothermal energy, fluid storage, engineering in planets and asteroids, and creating of atmosphere. The paper will discuss numerous applications for construction and surface research, the benefits of resource-saving deep-impact technology for rapid space settlement, defense technology transfer, terms of the implementation and budget ideas.

Mixed B – XB-5

Mars Colonist Candidate Selection & Training

MARK HOLDEN

The criteria by which the first Mars colonists are selected will have a direct impact on the success of the mission. This investigation will touch on the psychological stability of each individual candidate but focus on the way the crew works together in an extreme environment. Recommendations will be made based on the available data for selection of members and how to train to ensure the greatest likelihood of success. The complexity of interactions within a group makes it impossible to say with certainty what the "perfect" crew looks like, but there are well studied principles that can be applied to selection to increase the odds of success. Examples will be drawn from real world expeditions that most closely mimic the hardship that will be experienced during Mars colonization. Finally, the training of the teams will be explored to ensure that the selection criteria can be evaluated before leaving earth in more and more arduous training scenarios. The rapid impact construction of safe habitats and facilities is based on conceptual resource-saving technologies. The new technology provides shelter before landing with a leading ultra-high-speed impact penetrator, which is launched from the lander, adapting its kinetic energy. One of the scenarios of operations (version for Mars): - The target location can be chosen using the extensive Martian database of craters, lava tubes, soils, for example, preferring weak fractured grounds in areas of coinciding ancient craters. - The separation engine launches the penetrator projectile and transfers kinetic energy from the lander to the penetrator. The separator impulse decelerates the descent vehicle, facilitating a soft landing, and accelerates the penetrator by conserving energy and momentum. - The Deep-Impact Penetrator pierces the crater of a pre-designed shelter.Mixed B – XB-6

Mixed B – XB-7

Appendicitis Considerations in Long-Term Space Travel

LUIS ANDRES VALENZULA, ANGEL VALENZUELA

ALUIS ALBERTO BALAN CAN, AYLIN SALDIVAR

AUTONOMUS UNIVERISTY IR CIUDAD JUAREZ

Introduction: In long-term space travel, they must consider terrestrial pathologies that can occur in astronauts such as acute appendicitis. Studies based on NASA's Integrated Medical Model (IMM) have determined that appendicitis is very common in space. It has been proposed for more than a decade that the treatment of appendicitis on the trip to Mars will be conservatively without the possibility of surgery; However, there are aspects to consider such as failure of conservative treatment that occurs in 30%. Methodology: In this study a systematic search was carried out in July 2021 and 102 articles were selected in English and Spanish, most of the “OpenAccess” type that spoke about of appendicitis and its improvements in treatment, surgery in space, appendicitis in space and medical aspects of the trip to Mars. Results and discussion: Several implications should be considered: 1) the pathophysiology of appendicitis may occur differently in space, 2) The risk of cancer increases in space and appendicitis due to appendicular tumor does not respond to conservative treatment, 3) There is a Dysregulation of the immune system in space and bacteria could create resistance 4) For safe management by conservative treatment, CT is needed, which has not been considered in the trip to Mars, 5) you should consider conventional laparoscopic surgery or new techniques such as SILS , NOTES and ERAT to avoid the eventration of organs in microgravity, 6) prophylactic appendectomy can be an option by laparoscopy or using ERAT technique, 7) Great relapse in treatment with antibiotic therapy. 8) Surgical instruments can be 3D printed or stereolithography. Conclusions: Surgery in space should be considered since conservative treatment has high failure rates, antibiotic treatment can be used as first line and surgery should be performed.

Mixed B – XB8

Terraforming Mars? Games & Their Positive Impact on the Perception of Space Exploration

MIKOLAJ SOBOCINSKI

AMERICAN UNIVERSITY of the MIDDLE EAST

In the 1950s Wernher von Braun ignited the spark in America hungry for space travel. He published articles that presented wondrous visions worthy of SF writers of his time. In the years to come, together with another visionary, Walt Disney, they reached millions with images of rockets and space exploration. Both von Braun and Disney paved the road for the positive perception of Apollo missions and the discoveries yet to come. However, 65 years onwards, newspaper articles and animated TV shows will not entice the same enthusiasm anymore. In the world of daily tweets from Elon Musk or Jeff Bezos, in the years that belong to Netflix presenting new space exploration dramas and documentaries on a weekly basis, social campaigns must be both more interactive and immediate. The audience is waiting for a new Mark Watney to take them to Mars here and now. As surprising as it may seem, the last 20 years have seen the greatest rise in the video games & board games industries, constantly surpassing that of Hollywood, Silicon Valley, and even Cape Canaveral. There are hundreds of games that present players with dilemmas, issues, and solutions worthy of Mars mission control, astronauts, or even future colonies. It is happening here and now! The question remains if those games can play a similar role to what von Braun and Disney achieved in the 1950s. Can board games depict concepts worthy of space exploration discussions? Can games introduce topics to a wider audience? Can games generate public support which the whole industry will require in the years ahead of us? How can they do it? And finally, is there an obvious policy that Mars Society and other organizations can apply to win public support for space exploration?