

SMMAARTE: Space Medicine Medtech Analog Astronaut Research Training and Education

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Introduction

As space missions increase in duration the ability to establish permanent human presence in space increases, but the potential for medical emergencies and life-threatening injuries to occur will significantly increase as well, including mental health issues and medical diseases. Therefore, it is vitally important to develop new approaches to ensure optimum care and medical interventions if we are to succeed in long-term settlement in Space. The delivery and creation of “in-situ health and medical care,” i.e., providing physical psychological and physiological protocols and interventions, will be

mandatory medical requirement not only from a health perspective but also from a moral and ethical standpoint. This has resulted in the need for developing and creating innovative space medicine services, consultancy, medical research scientists, and space medics training within the commercial space medicine and astronaut healthcare verticals. Therefore, a paradigm for a new medical business model is needed, i.e., the “space medical clinic model” before humanity can become a multi-planetary species and attain permanence on off-world settlements or space cities on a planetary surface, such as the Moon and Mars.

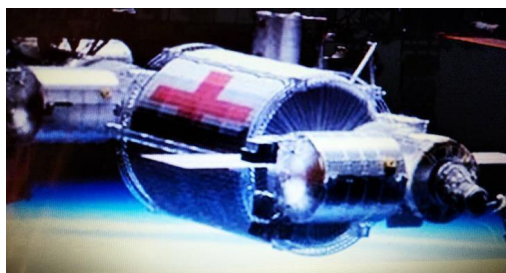


Figure 1. Space Clinic Module in LEO



Figure 2. Space Hospital on Mars

Space Medicine

Space medicine is a subspecialty of allopathic medicine and was specifically developed in the 1960s to take care of health and offer medical support for the NASA astronauts living and working in Space. The past decade we have seen the onboarding of commercial astronauts, and the expansion of space medicine has started to expand to cover the medical care for commercial astronauts and future space travelers. Space medicine focuses on maintaining and taking care of the physical, psychological, and physiological wellbeing and health of astronauts living in Space. Micro-gravity has many detrimental and negative effects on the human body, and it is still an unknown factor on how the body will evolve and the effects of long-duration missions and permanence living in altered gravities.

MMAARS Mars Medics (MMM)

Since 2014, MMAARS Inc (Mars-Moon Astronautics Academy and Research Sciences) in partnership with AvatarMEDIC Inc has initiated the development of a Space Medical Training facility, “The Space Clinic,” located in Mojave Desert in California. Over 2014, MMAARS has pioneered the development of remote, teleanesthesia-telesurgery protocols, and deployed multiple high-fidelity analog Space Medics training simulation missions to analog austere environments, such as the Himalayas, Death Valley, and the Mojave desert to test MedTech innovations and to train non-medical or reskill medical

professionals as Space Medics—analog astronauts living in remote, isolated, and confined environments considered to be similar to future crews living in Space or inside a space habitat on the surface of the Moon or Mars. To date, due to the success and valuable knowledge obtained from the deployment of many analog astronauts training missions, including the validation of our unique “Space Medics Training Program,” we are embarking on expansion plans to create the space medical facility space clinic project called “SM-MAARTE: Space Medicine and Med-Tech Analog Astronaut Research Training and Education” Center. This facility will train future commercial astronauts called “Space Medics” and Space Physician-Scientists in critical life-threatening interventions and continuous care for maintaining physical and physiological health and mental well-being of astronauts for deep space missions and off-world habitation. Thus, we have initiated at MMAARS (Mars-Moon Astronautics Academy and Research Sciences), a unique first-of-its-kind a vision of the “MODULAR ANALOG ASTRONAUT SPACE CLINIC” model to train future space healthcare astronauts and expansion of MMAARS’ unique Mars Medics Training Program.

The SMMARTE facility will be located at MMAARS training analog site located in the Mojave Desert in California. The medical facility will train future commercial astronauts called “Space Medics” and “Space Physician-Scientists” in critical life-threatening interventions and continuous care for maintaining physical and physiologi-

cal health and mental wellbeing of astronauts for deep space missions and off-world habitation. The Space Clinic focuses on integration of cutting-edge novel, frontier visions with innovative, transformative exponential technologies in MedTech, and healthcare for astronauts including the development of novel, new biological systems, the development of a new sub-specialty of behavioral health called “Astro-Psychiatry,” personalized medicine, genomics, translational medicine, and the integration of complementary medicine modalities. The facility will test and train

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