

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Poster Session (P)

Author: Mr. Jeremy Straub
University of North Dakota, United States, jastraub@gmail.com

Mr. Atif Mohammad
University of North Dakota, United States, atif.mohammad@my.und.edu

USING 3D SCANNING FOR REMOTE MEDICINE IN SPACE

Abstract

This paper provides an overview of human-size 3D scanning technologies, including their current (limited) use by medical professionals on Earth and how they support science, art and other focus areas. A low-cost and lightweight optical 3D scanner developed and deployed at the University of North Dakota is presented as a model for how a 3D scanner could be deployed on a spacecraft or the International Space Station to support telemedicine for assessing astronauts' health and for performing scientific experiments (involving astronauts or with inanimate objects). The types of disorders which could be detected or assessed using a 3D scanner are discussed and the value of the 3D scanner in both preventative medicine and treatment is considered. Mass, volume, power consumption, bandwidth utilization, cost and space utilization are considered in light of the astronaut health benefits and, then, in the context of using the system for astronaut health monitoring, human experiments, non-human experiments and space station (or experiment, etc.) maintenance. Multiple scenarios for its use are presented and assessed, including responding to an acute injury and the monitoring of muscles. From this, it is concluded that the 3D scanner would provide comparatively high benefit at low monetary, mass, volume, power and data costs. We also consider how the 3D scanner could be utilized to enable outreach activities via capturing imagery and CAD models of objects in microgravity.