IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Life and Physical Sciences under reduced Gravity (7)

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SLIT LAMP FOR USE IN SPACEFLIGHT‘

Abstract

A real-time sensitive imaging platform, dubbed SlitTrek, will be utilized for early detection and diagnosis during spaceflight of neurological, circadian rhythm, ocular, hemodynamic, and cardiovascular condition, based on a fast (¡5 minute) multispectral high-resolution imaging of the pupil and microvascular features in the front of the eye. Innovative, advanced image processing algorithms and machine learning methods will be employed to detect spatial- and temporal-morphological changes in the eye. Medical studies conducted in space in the ocular domain aim to gather physiological data to elucidate the risk of ocular conditions on crewmembers assigned to space missions. Astronauts who complete long-duration missions may experience eye problems, encompassed by a range of evolving, overlapping terms, notably spaceflight-induced intracranial hypertension (SIIH), visual impairment intracranial pressure (VIIP), and space-associated neuro-ocular syndrome (SANS). Such conditions affect roughly 70Our study seeks to establish whether a crewmember without medical training can perform a successful eye test with all associated benefits involved. Analysing test results of the Slit-Trek device will allow information gathering about performance in spaceflight. This builds upon experience gathered from on-Earth studies in extreme conditions and zero-G flight testing. In-flight, SlitTrek will be used for tracking the pupil light reflex for very short (500msec) red and blue light stimuli, to assess neurological, neuro-retinal and circadian rhythm in flight disturbances. Additionally, performing multispectral high-resolution imaging of blood vessels on the front of the eye to detect spatial-morphological and temporal-morphological changes associated with cardiovascular changes and inflammation.