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Author: Ms. Rym Chaid
Concordia University, Canada, rym.chaid@gmail.com

Ms. Amanda Spilkin
Canada, amanda.spilkin@mail.concordia.ca
Mr. Alessio Cusmano
Concordia University, Canada, alessiocusmano@gmail.com
Ms. Amy Tran
Concordia University, Canada, amy.tran@spaceconcordia.ca

INCREASED EFFECTIVENESS IN CARDIOPULMONARY RESUSCITATION THROUGH THE DEVELOPMENT OF CPRAD, A NOVEL CPR ASSISTANCE DEVICE

Abstract

As the duration and frequency of space missions increases, the need for facilitative and effective life support technologies becomes integral to medical care and interventions in the space environment. Amongst the greatest concerns is human cardiovascular health and interventions during cardiac arrest. In pursuit of better understanding of effective factors around cardiopulmonary resuscitation (CPR), our CPR-assistance device (CPRad) will provide a novel feedback monitoring system to aid bystanders in the delivery of successful CPR. The CPRad consists of sensors measuring (1) displacement for compression depth, (2) force for compression weight, and (3) ultrasound doppler readings for measuring changes in blood flow across the carotid artery. The system thus permits the calculation of a running average of compression and resultant heart rate. The CPRad prototype is first tested upon a sophisticated heart simulator and provides a real-time digital interface for physiological data when performing CPR. The heart simulator is developed at the Laboratory for Cardiovascular Fluid Dynamics at Concordia University and provides an accurate representation of human heart anatomy. The compact design and portability of the CPRad provides feasibility of testing the model in parabolic flight to address the increased complexity of delivering CPR in a reduced gravity environment.