DELIVERY OF CARDIOPULMONARY RESUSCITATION IN THE MICROGRAVITY ENVIRONMENT. M. R. Banner*, and R. D. Billica*. KRUG Life Sciences and Medical Operations, NASA Johnson Space Center, Houston, TX 77058.

INTRODUCTION. Cardiopulmonary resuscitation (CPR) is performed for on-site medical emergency situations, and the environment contains several challenges for delivering effective cardiopulmonary resuscitation (CPR). Chest compressions must be driven by muscular force rather than by the weight of the rescuer's torso. Airway stabilization is influenced by the neutral body posture. The rescuer will consist of crewmembers of varying sizes and degrees of physical deconditioning from spaceflight. Several ACLS CPR designed to accommodate these factors were tested in the one g environment, on parabolic flight, and on a recent shuttle flight. METHODS. Utilizing study participants of varying sizes, different techniques of CPR delivery were evaluated using a recording CPR manikin to assess adequacy of compressive force and frequency. Under conditions of parabolic flight, methods tested included conventional positioning of rescuer and victim, free-floating “aircraft.” The hardware was made available for use during the MTC phase of the space station was utilized to increase the fidelity of the spaceflight scenario and evaluate the prototype equipment. Based on initial testing of CPR and ACLS, changes were made to the venricular fibrillation algorithm to accommodate the space environment. No other constraints to delivery of ACLS during parabolic flight onboard the KC-135 aircraft. The hardware was made available in a phased approach to provide advanced medical care for Space Station Freedom. RESULTS. The delivery of ACLS in microgravity is hindered by the environment, but should be adequate. Factors specific to microgravity were identified for inclusion in the protocol including immediate restraint of the patient and early intubation to insure airway. External cardiac compressions of adequate force and frequency were administered using various methods. The more significant limiting factors appear in the strategy of CPR during parabolic flight onboard the KC-135 aircraft. The hardware was made available to accommodate the space environment. Under conditions of parabolic flight, methods tested included conventional positioning of rescuer and victim, free-floating “aircraft.” The hardware was made available for use during the MTC phase of the space station was utilized to increase the fidelity of the spaceflight scenario and evaluate the prototype equipment. Based on initial testing of CPR and ACLS, changes were made to the venricular fibrillation algorithm to accommodate the space environment. No other constraints to delivery of ACLS during parabolic flight onboard the KC-135 aircraft. The hardware was made available in a phased approach to provide advanced medical care for Space Station Freedom.

CONCLUSIONS. Delivery of effective CPR in microgravity will be dependent on adequate restraint of rescuer and patient, restraint techniques and experter size and preference. Free-floating CPR may be employed as a stop-gap method until patient restraint is available. Development of an adequate CCAD would be desirable to compensate for the effects of deconditioning.