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CRYOGENIC AIR PURIFICATION FOR DEEP SPACE EXPLORATION.

Abstract

Deep space exploration and settlement represents a new frontier for the progress of mankind. From the first stratospheric flight to the Apollo missions to the International Space Station, the occupancy and duration of flights have raised tremendously. It has put increasing demands on life support systems capabilities. Within the realm of air revitalization, several technological milestones have been witnessed from using gas bottles (O2) or single shot chemical capture (LiOH) to current regenerative adsorbent beds (molecular sieves, amines). Looking forward, the next milestone technology must be able to provide air revitalization systems capable of handling tens of crew members for decades. Next generation systems must not only improve efficiency and reliability but they must become very low maintenance and require minimal consumables. ALAT defends the use of capture and separation of air pollutants by cryogenic means as a promising candidate. ALAT proposal is strongly supported by its long standing experience and heritage in functional technologies (gases engineering, cryogenics) and system development (life support, cooler and distillator and separator). In this presentation we will introduce the first results of our breadboard demonstrator targeted at the ISS and how it could be extrapolated for a lunar mission.